BETTER FRUIT

VOLUME XIV DECEMBER, 1919 NUMBER 6

FEATURES IN THIS ISSUE:

SOME OF THE FINE FRUITS OF FRANCE

Before the war the orchards of Northern France produced large quantities of the finest of deciduous fruits. During the great conflict an immense orchard area was devastated by German troops. It is estimated that the destroyed territory devoted to agriculture covers 6,000 square miles, 250,000 acres of which was rendered absolutely useless for cultivation. The loss to soil and crops is estimated to be $2,000,000,000.

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Practical Pruning as Applied to Apple and Pear Trees

By O. M. Morris, Horticulturist, Washington State College of Agriculture

(PART ONE)

THE best place to study pruning is in the most productive orchards in the community. Study there the system of pruning that has been practiced on the best and most satisfactory producing trees. Become acquainted with the habits of growth of the different varieties and the form of the tree at different ages. Adopt a system of tree development that has given satisfactory results in your community in the quantity and quality of fruit produced. Systems of pruning recommended by fruit growers from different sections than yours may not be at all satisfactory in your district. A system once adopted and established should not be changed except for very good reasons.

Apple Trees.

The one-year-old tree just set in the orchard should be cut back to a straight stock about three feet in height. This cutting back should determine the height of the trunk. The upper buds left will usually be the ones to produce the branches that will form the framework of the head. These branches which are to form the permanent framework of the tree should be distributed through a space of 12 inches, extending downward from the top of the young whip. The branches that are only three or four inches apart on the young tree will be too close together by the time they are four or six inches in diameter. Trees with a clean trunk 20 to 24 inches high are easier to cultivate and work around than trees with a shorter trunk, and a few inches difference in the height of the trunk of the tree does not modify greatly the convenience of the work of pruning, spraying and harvesting the fruit crop. The extremely short trunk is not as popular after the trees are in full bearing as it is while the trees are two or three years of age.

Trees that are growing very rapidly and producing long slender shoots can be made more stocky by clipping off the growing tip of the branches during the summer. Branches on the windward side of trees exposed to strong prevailing winds can sometimes be kept growing in almost normal position by careful attention to summer tipping back. Trees that are vigorous and strong will grow in better form with little or no care, than weak trees

Figure 1. A young Jonathan tree pruned to a central leader form. This is a good type of tree and is well pruned, altho not quite ideal, because of the low trunk.

can be developed with all the pruning and training that may be given them.

The two-year-old nursery tree is seldom used in Washington for planting commercial orchards. It can sometimes be used to advantage for home orchards and in replanting, but must be severely cut back at the time of transplanting. The three to five branches selected to form the framework are cut back to about one-third of their length and all others removed. In varieties like Jonathan, Winesap and Ben Davis, the center or leading branch should be left several inches above the highest side branch. Cutting all branches back to three or four buds may be advisable if the trees have been exposed to drying conditions after digging, or if they are to be planted in a district of light rainfall without irrigation. When good trees are planted in a section where moisture is abundant, as in most districts of Western Washington, they will make a good growth if given only enough pruning to secure a well balanced top.

The tree that has made one year's growth in the orchard should be carefully pruned, although this pruning should not necessarily be extremely heavy. A few years ago, when so many commercial orchards in the Northwest were young, the practice of very severe pruning of young trees was common. It was carried to a destructive extreme in many cases. Winter pruning that cuts away three-fourths or four-fifths of the previous summer's growth of wood does not assure a stocky growth of trunk and permanent branches, but causes the production of another crop of long, whip-like branches. It is not necessary at the first winter pruning to select the branches that are to form the permanent frame of the tree and remove all others; but if they can be selected, the pruning should be so done as to give them the advantage. A little thinning out of the top to let sunlight in and tipping back of the longest shoots is usually all that is necessary at this time. It may not ruin the tree to do more, but usually, light pruning will accomplish about all that can be accomplished by a more severe pruning.

The old controversy as to the advantages of a tree with a central leader or one that has been developed in vase form is not discussed so much as the orchards grow older. Neither ex-

treme form is desirable and both forms are foreign to the natural development of the tree, and if the tree is given reasonable opportunity to develop this extreme soon disappears. The natural and best form is about midway between these extremes. The center of the tree must be open to light without regard to the particular way in which the scaffold limbs are distributed. Trees that are prone to develop low drooping side branches, as the Jonathan, can often be developed in a form of central leader type for a few years to advantage. Other varieties, as the Esopus and Rome Beauty, do not lend themselves well to this type of young tree. The vase form is purely an artificial type conceived in the mind of the grower. The trees can be trained to this type, but it is seldom a profitable form.

The Second Winter Pruning

Thin out the top of the tree where the number of branches growing is so great as to cause the limbs that are more or less permanent to be very slender. Small side shoots should not be removed because of their value in helping to develop and make more stocky the main branches to which they are attached. The top should be opened by removing large limbs as far as possible without destroying the frame of the tree. The large limbs

Figure 2. A Delicious tree that has been excessively pruned. It is now carved out to the vase form.

wood that is where none is wanted and correct faulty distribution of branches. The main business of the tree during the period of development before heavy fruit production begins is to produce wood, or to grow, and for this purpose an abundance of foliage and small twigs are necessary. It is a wise plan to leave plenty of wood in a tree to be taken out later, but all branches that interfere with the framework should be removed. Wood once taken out cannot be easily replaced by new growth, but excessive growth can be cut away at any time.

From the time of the second winter pruning until fruit production is established, pruning should be done with the idea of training to the adopted system more than modifying growth. Most of the work should be done in the winter, but constant attention throughout the year is necessary to have the trees make the most rapid permanent progress. The top should be open enough to let a little of the direct rays of the sun reach the ground beneath. The change from a nursery tree to a tree in full fruit production is gradual without definite dates or sudden changes from one stage to another. Pruning is only one of the several cultural practices necessary to secure the maximum fruit production and it cannot be used successfully as a substitute for soil fertility or good tillage. If the trees are well grown in the nursery and well planted on good soil and if thereafter they receive plenty of moisture and soil tillage, they will develop into good fruit producers.

In pruning young trees, a great deal has been said and practiced relative to the point at which one-year-old branches should be cut. A great deal of emphasis has been placed by some pruners upon cutting the branch diagonally so that the base of the cut would be opposite a bud. If they desire to have the trees spread more they cut back to a bud pointing toward the outside of the tree. The careful cutting close to the bud avoids the dead stub that develops if a twig is cut one-half inch or more above the bud. The tip bud left on the branch usually assumes almost the original

Figure 3. A Jonathan tree exeessively pruned by eonstant eutting back and removal of small twigs, resulting in an over abundanee of large braneh̃es about the same size. A tree of this type requires the removal of a large number of these large braneh̃es with a minimum eutting of small ones.

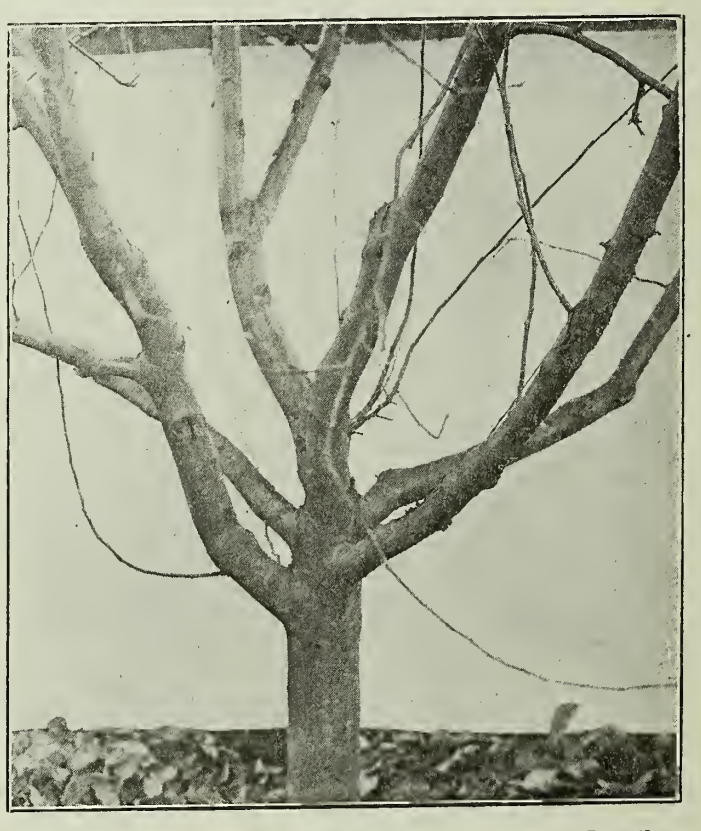

Figure 4. Trunk and framework of a young Jonathan tree after bearing its second crop of fruit. A form thought to be almost ideal by many growers. The trunk is too short and the braneh̃es too nearly horizontal in their direetion. Sueh trees usually require heroie treatment later, with the resulting loss of production.

and trunk require protection from extreme heat of the summer sun and the development of a reasonable quantity of laterals tends also to bring the tree into early fruit production.

Beginning with the second winter pruning the work should be mostly corrective in its character. Prune out

direction of the branch and the lower branches from side buds because of their position and exposure to light assume lateral directions. It is often advisable to develop lateral spreading branches by first pruning to an inside bud and the following year cutting back to the second or third branch which has assumed a distinctly lateral direction. This is especially true with Rome Beauty and Wagener.

In pruning trees four years old, or older, the extra care required to "cut to a bud" is not worth while. Side branches, however, that are removed should be cut close to the parent branch; and terminal branches, when cut back to side branches, should be cut close so that no stubs are left.

Fruiting Trees

Green skin varieties may be permitted to develop a more dense top than red skin varieties; but a thick top tends to shade and kill the interior branches and twigs, and to cause the production of fruit to be carried by the branches further from the trunk. This reduces the load of fruit that can be carried by the tree and is not desirable. Red skinned varieties should have the tops of the trees kept sufficiently open so that good strong sunlight can reach past the center of the tree top. This will maintain strong, even development of the fruit spurs and lateral fruiting branches, and secure the maximum coloring of the fruit.

As the trees attain age, the amount of pruning done on each tree should be increased and the amount that should be done will depend upon the growth and development of each individual tree. Enough of the top should be removed to keep it open and shapely, and in a good, vigorous growing condition without reducing its fruit production. No definite rules can be given, but the skill of the grower will be measured by the degree of accuracy of balance between his pruning and other cultural operations that cause the tree to yield its maximum quantity and quality of fruit annually.

Special practices in pruning, such as girdling, stripping of the bark, and other mechanical injuries intended to induce fruit production on vigorously growing trees, are extreme measures and are not to be advised under ordinary conditions. If trees will not bear good crops of fruit without these special treatments, they are not adapted to their location and should be removed.

Figure 5. A Jonathan tree of the same age as Figure 4 but of better form.

Figure 6. A common type of trunk and base of the framework of a nature fruiting Jonathan tree.

(Editor's Note—This eoneludes the part one of Professor Morris' article on "Praetical Pruning as Applied to Apples and Pears." The seeond part whieh will inelude the Season of Pruning, Pruning the Different Varieties of Apples, Repairing Injured Trees and Pruning Pear Trees will be published in the January number.)

Increasing the Production of Bush Fruits

By W. H. Paulhamus, President of the Puyallup and Sumner Fruit Growers' Association

THERE is now a decided tendency toward a big development of the bush fruit industry. The present demand for jellies, jams, juice products and preserves has given a new stimulus to the growing of bush fruits, consisting of blackberries, red raspberries, black raspberries, gooseberries, red and black currants, loganberries and phenomenal berries, and in fact every other kind of berries that do so well in our North Pacific Coast climate.

A few years ago red raspberries were a drug on the market at four to five cents per pound, today the canner is paying the grower eight cents per pound for the same product, and is unable to secure a sufficient quantity to take care of his requirements. The old evergreen blackberry that has been so much of a pest to the average farmer has certainly come into its own, with a result that every canner is anxious to secure all of the evergreen blackberries that are obtainable, and is willing to pay a price ranging from five to five and one-half cents per pound. In fact, every cross-roads merchant can create a market for these blackberries by arranging to put them in barrels for some responsible canner, and ship them daily to a cold storage plant, in other words, the present prices of all brush fruits should stimulate very materially an increased production.

The question that naturally arises in the mind of the man who has a few surplus acres of land is the advisability of planting; what variety to plant; how they should be planted, and the best method of handling after the planting is completed.

In red raspberries the desirable variety is the Cuthbert, for the reason that it can be used in jam making or in canning in syrups. There is no other red raspberry grown that has sufficient texture to withstand the necessary processing required in putting up in cans. Of course, in jam making it doesn't make any difference how much the berry is crushed up, the jam is equally good, but this is not

Continued on page 35.

How the Ruined Orchards of France Are Being Restored

Written for Better Fruit by an Invalid Soldier

A NATION'S progress, credit, the health of her populace, the success of her industries and manufactures, largely depend upon the condition of her agriculture. Four years of war, during which the enemy invaded the land, spreading desolation and devastation, not to mention the depletion of man-power, has woven the agricultural problems of northern France into a tangle which defies the learned. The solution of her agricultural problems is not charity; it is merely the simple exercise of the spirit of compassion toward a helpless people in the hour of their need. Moved by this spirit of compassion, of fraternal duty, and of patriotism, the American Red Cross has pledged itself to serve the agricultural interests of the impoverished country.

Through generous contributions of the American people, the American Red Cross was enabled to send practical and theoretical men to France to determine conditions; how they would be met by the government and the people; and what foreign aid was needed and might be enlisted. George B. Ford, deputy commissioner of the American Red Cross in Paris, was placed in charge of the research work. He had formerly been a consulting specialist on town planning in New York City.

In many sections of France the devastation of its fine orchards by the German troops was of the most wanton nature recorded during the entire war. Hundreds of acres of orchards that were not in the pathway of troop operations and gun fire were deliberately cut down and burned, and the once blooming hillsides and other land adaptable to orchards left scarred and desolate. Like other phases of agriculture in France before the war, horticulture and fruit growing were carried on by the most careful and intensive methods. No matter how small the acreage in fruit or how few the trees under cultivation, they were given the most tender care. In fact such care as the American fruitgrower with his greater resources of undeveloped land and larger acreages has never attempted. Every fruit bud was to the Frenchman an undeveloped form of life to be cared for with the solicitude of the unborn child. This was due to the fact that it not only meant an addition to his income so thriftily looked after, but to the fact also that the French are lovers of nature—of flowers of the green forests—of all the growing things of life that are produced from the earth.

Before the war many fine fruits were grown in the part of France that was overrun and largely destroyed by German troops. These fruits were given the greatest care in growing and marketing, not only in the open, but growing them under glass was also practiced. In fact Americans who visited France and were interested in fruit often marveled at the perfection of the fruits served at the high-class cafes in Paris. Not a flaw in the shape, coloring or the quality could be found. And these fruits, such as pears, peaches, plums and grapes, brought extremely high prices—prices that caused the American visitors to marvel likewise until they were informed as to the care taken of them in the growing.

It is little wonder, then that the great destruction of the orchards of France caused grief and hardship to the French. But with that heroism and patience for which they are noted, they are going to work to restore them and the American Red Cross is helping them.

A mutile, with both hands gone, wielding his spade at the school established for French mutiles by the American Red Cross at Rannes, France.

The belt of agricultural devastation in France stretches for 150 miles and is from five to ten miles wide. The total invaded area includes about 15,000 square miles, five per cent of the acreage of France, including about 35,000 communes with a population of 4,000,000. The devastated area, about the size of Connecticut and Rhode Island, comprises 6,000 square miles, or about two per cent of France, and in which 2,000,000 people lived. According to the report of the Minister of the Liberated Regions, this was fifteen per cent of the tillable area of the country having an agrgicultural population of about 807,000 persons. About 250,000 acres have been rendered beyond cultivation by the war.

In this neighborhood there were 250,000 farms, of this number 110,000 were less than two and a half acres each, 100,000 were upwards of twenty-five acres, 26,000 were from twenty-five to 100 acres each, and about 5,500 were over 100 acres, many of them belonging to factory workers. The original capital investment was about $4,000,000, or $1,600 per farm, but the value of farms in France has now doubled.

A government engineer, detailed to inspect the loss of agricultural implements, placed the total number at 666,000, which included the various kinds of plows, mowing machines, farm wagons, hoes, fertilizers, reapers, binders, root-cutters, et cetera.

There were 607,000 horses in the country in 1914, prior to the war; there were in 1915, 242,000, sixty per cent having been lost. In addition, 380,000 of the 850,000 stock were gone, or about fifty-five per cent.

After a thorough investigation, conservative judgment being exercised, the total loss to soil and crops was estimated by the French government at two billion dollars.

It was not only this initial loss, but the agencies for commencing the tilling of the soil, the re-establishment of farms, were gone. It would be impossible for the poverty stricken farmer to purchase implements because of the condition of the mines and factories. The work must be done by the government, which then appropriated $60,000,000, with a revolving fund of $20,000,000. To further assist the work of reconstruction, a tractor service was organized with 15,000 machines.

The part played by the American Red Cross was an important one. A Reconstruction Research Bureau was opened and a Red Cross delegate placed in every invaded department. The work was especially concentrated

upon the after-war reconstruction of the small farmer and with this in view, the Red Cross brought together the leading French and many American specialists to consider the problems and to decide upon the most wise solution.

The wondrous old orchards in Northern France had been laid to the ground, and, for replanting them, the Red Cross contributed 40,000 fruit trees. 50,000 francs were also appropriated for the cultivation of small fruits.

Southern France is a great fruit country, and here the vineyards are suffering from the unavoidable shortage of labor. Many men from this part of the country are attending the Red Cross Agricultural School at Rannes. Here the "Mutiles" are fitted with artificial appliances which will permit them to wield the farmers' tools. They return, when well, to their communities to earn their livelihood and to cultivate their neglected fruit-lands.

A happy group of Harvesters at an American Red Cross hospital farm in France run solely by convalescent soldiers. These men are being taught agriculture that they may return to their homes and help in the restoration of the fruit and other soil products of their native land.

While solving the housing problem of refugees, the Red Cross has simultaneously solved one in agriculture. There were hundreds of homeless families wandering over France, forced from their homes by the invasion. These were collected and replaced in communes. The Red Cross communes consisted of thirty or forty buildings which accommodated about seventy-four persons each. Five of these villages were constructed near the Somme. The people were given the necessary farming equipments and not only did they supply their own needs, but soon began to help surrounding communities.

Lands were rented from the government by the Red Cross and given to the refugees and repatries to cultivate. Agricultural centers were established, an especially flourishing one being at Bourges-Montefaut.

In the military hospitals were hundreds of men, unable to be removed from medical supervision, yet capable of engaging in the farming occupations and eager for employment. So it was, that gardening and horticulture became a part of the cure of the army hospitals, the Red Cross supplying the necessary materials. The work proved beneficial to the men, especially to the shell-shocked and the tubercular. Many were experienced fruit-growers and welcomed the chance to get back to "the simple life." Both French and American soldiers took part in this work and many prosperous farms are now in operation. In fact, the experiment was so successful that it has been introduced in hospital work over here.

The raising of vegetables was especially favored by the men, because their labors were so soon rewarded. At Base Hospital No. 6, the soldiers' gardens produced two tons of vegetables in a season. They served to supply the mess officer with foodstuffs and gave the boys dishes which would have cost a fortune had their contents been purchased by the quartermaster.

The response of the French people to the efforts of the governmnt and the Red Cross to assist them to regain their lost fortunes has been most gratifying. Fighting against great odds, suffering from ill health, from sorrow for lost ones who fell in the war, the people, with a valiant spirit worthy of those who died for their protection, are taking up the task of rebuilding the orchards of France.

The Red Cross has established schools for the children, where modern agricultural methods are taught. This, coupled with the natural intuition and the knowledge gained from associates, promises to make an intelligent group of agriculturists, through whose efforts, the ruined orchards of France will be restored in a far shorter time than would have been otherwise possible.

Improving the Seedling Walnut—Important

By J. C. Cooper, President of the Western Walnut Association

The request for information concerning the best seedling walnut grown in the Northwest has been an issue ever since the Western Walnut Association has been in existance. Some years ago I published a blank for giving the history of seedling trees and nuts, but of the thousands distributed in this and other states, not more than three blank cards were returned filled out. Committees have been appointed year after year, and furnished with blanks with orders to comb the country for the best seedling walnut trees. All of this has been productive of no material results.

Finally, two years ago, Mr. M. McDonald, of Orenco, offered in the name of the Walnut Association prizes aggregating $100 for the best seedling walnut. Owing to the disturbed condition of the country last year, nothing was done. A few weeks ago Mr. McDonald called my attention to the matter and I appointed a committee which I think will make a start toward the object of our search.

A seedling walnut adapted to our soil and climate is of paramount importance to the industry of the Northwest, and the search therefor takes first rank in the duties of our association. To be of material value this seedling must be a better nut with all other conditions of vigor, timely growth and productivity than any we have. But to use a slang phrase, the proposed seedling will have to "go some" to beat the Meylan, Wiltz, Franquette and possibly some others.

There are seedlings already growing that equal these standard varieties in many respects, but it may take some years of orchard tryout to establish their claims of being the super nut of commerce. In the meantime the standard varieties will be reaching out and occupying much of the lands suited to the walnut. The demand now for grafted trees is beyond the combined powers of all the nurseries in the Northwest to fill in the next four or five years.

This need not stop the search or discourage the experimenter who loves his work and his country with its coming millions of nut eaters, who will demand the best, and we must stick to the trail of the seedling, even if we did not have the inspiring and patriotic offer of prize money. A seed-

Continued on page 36.

Information on the Measurement of Irrigation Water

By O. W. Israelsen of the Utah Agricultural Experiment Station

THE economical use of water in irrigation depends primarily on water measurement. That significant advantages, public and private, attend the measurement of water delivered to individual irrigators has long been recognized in older irrigated countries. The rapidly increasing utilization of Utah's available water supply, the consequent increase in its value, and the tendency on the newer canal systems to base the annual irrigation charges on the amount of water used make an understanding of the methods of water measurement an absolute necessity. Furthermore, many irrigators now realize that the vast store of information concerning the relations of water, soils and plants that has been accumulated in years past cannot be utilized in practice without the measurement of water.

As a result of the growing appreciation of the value of water measurement, there is frequent inquiry as to materials and methods used in measuring water under different conditions. To facilitate the answering of such inquiries, and otherwise to spread information concerning water measurement, this circular is prepared.*

*No attempt is made to present an exhaustive discussion of the subject. The material is simply a compilation from State and Government publications on water measurement. An attempt is made to meet the needs of practical irrigators and canal company officers and hence technical language is avoided where possible.

Units of Water Measurement.

The units of water measurement naturally fall into two classes: first, those expressing a specific volume of water at rest, and second, those expressing a rate of flow.

Water at Rest.—The commonly-used units of volume of water at rest are the gallon, the cubic foot, the acre-inch and the acre-foot.

Flowing Water. — The commonly-used units of rate of flow are gallons per minute, miner's inches, cubic feet per second and acre-inches per hour.

Convenient Relations.

Some convenient relations between the units of flow above given follow:

First: One cubic foot per second (c. f. s.) or (sec.-ft.)=450 gal. per min. (g. p. m.) (approximately) because there are nearly 7.5 gal. in one cu. ft. and 60 sec. in one min. and therefore 7.5x60=450 g. p. m.

Second: One cubic foot per second (c. f. s.)=one acre-inch per hour, (approximately). Since there are 60x60 =3600 sec. in 1 hr., one c. f. s. will give 3600 cu. ft. in 1 hr. and there are 1-12 of 43560 cu. ft.=3630 cu. ft. in one acre-inch. One c. f. s. therefore equals one acre-inch per hour (approximately).*

*(It will be noted that saying that 1 c.f.s. is equal to 450 g.p.m. is true within ¼ of 1 per cent and that 1 c.f.s.=1 acre-inch per hour is true within 5/6 of 1 per cent, both of which are amply accurate for practical purposes.)

Third: One cubic foot per second (c. f. s.)=50 Utah miner's inches.

Use of Convenient Relations.—Examples of how to use the above relations are given below:

1. An irrigator is entitled to 3 c. f. s. to irrigate a 10-acre alfalfa tract. How long will it take him to apply 5 acre-inches per acre? Note that the quantity of flow, the area to be irrigated and the average depth of water to be applied are given. The necessary time is to be found.

To do this proceed as follows: 3 c.f.s.=3 acre-inches per hour. The total number of acre-inches needed is 50, that is, 5 on each of 10 acres. Since each hour brings 3, the time necessary is 50÷3=16 2-3 hours. *Ans.*

2. Smith has a pump which discharges 900 g.p.m. If he spends 30 hrs. in irrigating a 10-acre orchard, what average depth in inches does he apply?

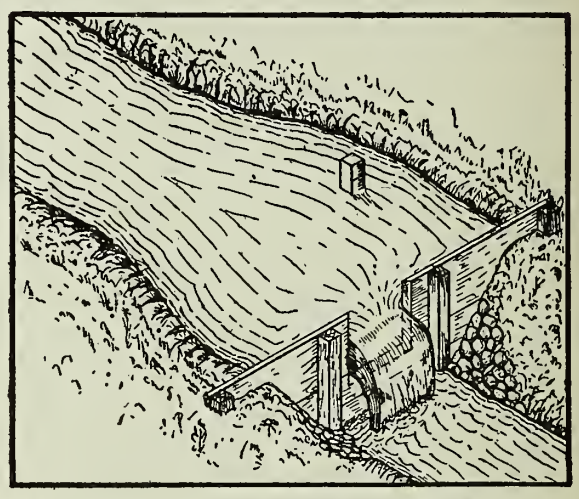

Fig. 2. Weir notch and bulkhead in weir pond.

Note that the quantity of flow, the time run and the area of land covered are given, and that the depth of water applied may be found as follows: 900 g.p.m.=2 c.f.s.=2 acre-inches per hour. Therefore, in 30 hrs., 60 ac.-in. will be supplied, and this amount spread uniformly over 10 acres will cover it to a depth of 6 inches. *Ans.*

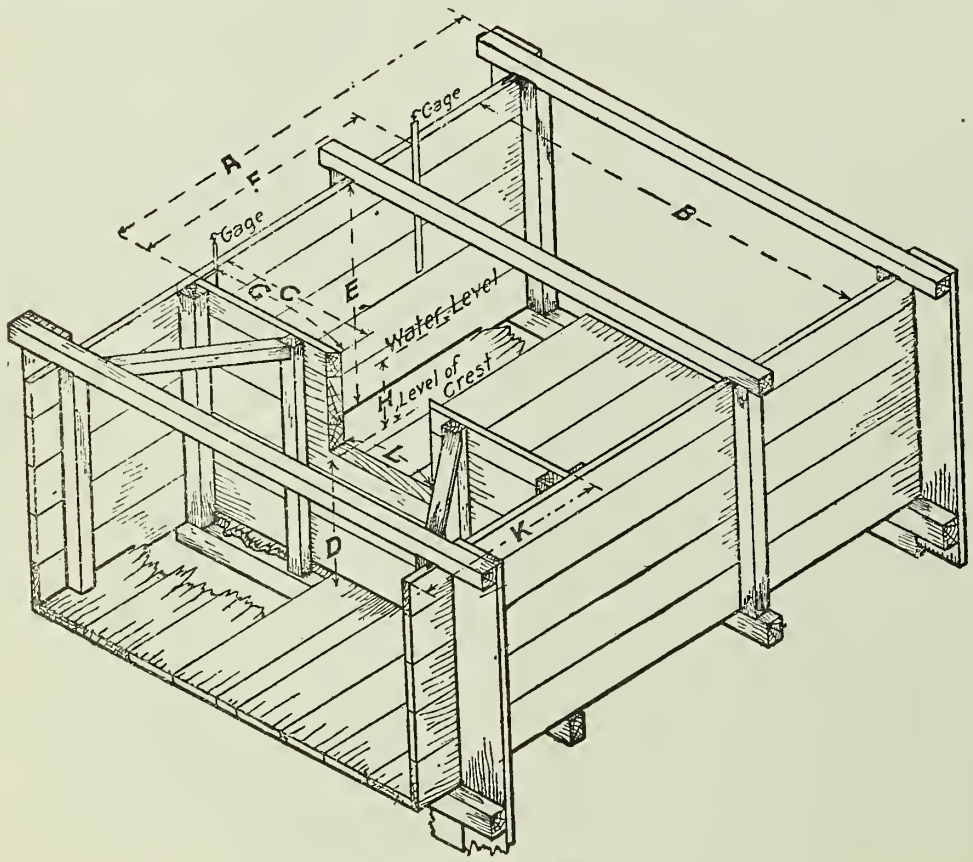

Fig. 1. Plan of weir box.

Weirs Having End Contractions. †

Descriptions of the rectangular, the trapezoidal§ and the 90-degree triangular notch weirs, with "complete contractions," free fall and sharp crests are accompanied by tables for each weir. The quantity of water passing over either weir can be determined by use of the proper table. The depth of water flowing over the weir must be determined and if the rectangular or trapezoidal weir is used the length of weir crest must be known. For example, if the length of trapezoidal weir crest is 2 feet, that is the bottom width of the notch, and the head or depth of water over the weir crest is ½ foot or six inches, the discharge will be 2.37 cubic feet per second.

†A weir having end contractions is one in which the length of the weir crest is so much less than the width of the water channel that the water filaments are completely deflected in flowing from the sides of the channel past the sides of the weir.

§This weir is also called the Cipolletti weir after the engineer who designed it.

The following definitions taken from Farmers' Bulletin 813, U. S. Department of Agriculture, by V. M. Cone, will make clear the above and other terms used in connection with weirs.

Definitions.—"A bulkhead or wall built across a ditch or stream, with an opening cut in the top of the wall through which the water is allowed to pass, is called a 'weir' and the opening is called the 'weir notch.' The bottom portion of the ditch immediately upstream from the bulkhead is the 'weir box' or 'weir pond.' The height of the water surface in the weir pond above the weir crest is the 'head.' When the water flows over the crest into the air before it strikes the surface of the water in the ditch downstream from the bulkhead, it is said to have 'free fall,' and when this overpouring stream of water touches only the sharp upstream edge of the crest, the weir is said to be 'sharp crested.' The weir notch must have a definite shape and size. The horizontal distance from the end of the weir crest to the side of the weir box is called 'end contraction,' and the vertical distance from the crest to the floor of the weir box is called 'bottom contraction.' When these contraction distances are great enough to cause a pondlike condition, which permits the water to approach the weir notch without any appreciable velocity, the weir is said to have 'complete contractions.'"

Advantages and Disadvantages of Weirs.—The advantages of weirs for water measurement are: (1) accuracy, (2) simplicity and ease of construction, (3) non-obstruction of moss or floating material, and (4) durability.

The disadvantages are: (1) the requirement of considerable fall of the water surface, or loss in head, which makes their use in sections having level land impractical, and (2) the collecting of sand and silt above the weir which prevents accuracy of measurement.

Weir Box and Pond.—In the use of either of the weirs above described, the ditch or canal must be made wider and deeper than the average section of the canal for some distance upstream from the weir. This is to make the water approach the weir very slowly by flowing through a relatively large channel. The enlarged section of the ditch should be gradually tapered to the natural size about 40 to 50 feet above the weir. Cross currents just upstream from the weir must be prevented.

The weir may be placed in a weir box built of lumber or concrete, as shown in Fig. 1, or it may simply be placed in an enlargement of the ditch.

Less room is required when a box is used but cleaning is made more difficult. For temporary use the placing of a weir in the open ditch as in Fig. 2 is the more economical method.

Cleaning is also less expensive in the open ditch as a scraper may be used. The ditch downstream must be protected with loose rock or other material to prevent washing by the falling water.

Table I, taken from Farmers' Bul. 813 by V. M. Cone, Irrigation Engineer for the U. S. Department of Agriculture, gives the sizes of weirs best adapted to measuring streams of water varying from ½ to 22 cubic feet per second, and also the proper dimensions for each size of rectangular, trapezoidal and 90-degree triangular notch weirs.

Table 1.—Weir-box dimensions for rectangular Cipolletti, and 90-degree triangular notch weirs.

(All dimensions are in feet. The letters at the heads of the columns in this table refer to Fig. 1.)

RECTANGULAR AND TRAPEZOIDAL WEIRS WITH END CONTRACTIONS

Flow (second-feet)	H Maximum head.	L Length of weir crest	A Length of box above weir notch	K Length of box below weir notch	B Total width of box	E* Total depth of box	C End of Crest to side	D Crest to bottom	F† Hook gage distance	G§ Hook gage distance
½ to 3	1.0	1	6	2	5½	3½	2¼	2	4	2
2 to 5	1.1	1½	7	3	7	4	2¾	2½	4½	2
4 to 8	1.2	2	8	4	8½	4½	3¼	2¾	5	2½
6 to 14	1.3	3	9	5	12	5	4½	3¼	5½	3
10 to 22	1.5	4	10	6	14	5½	5	3½	6	3
90-degree triangular notch weir.										
½ to 2½	1.00	..	6	2	5	3	2½	1½	4	2
2 to 4 1/3	1.25	..	6½	8½	6½	3¼	3¼	1½	5	2½

*This distance allows for about ½ foot freeboard above highest water level in weir box.
†Equals distance from crest upstream to gage.
§Equals distance from end of crest over to gage.
*Cone, V. M. "Construction and Use of Farm Weirs," Farmers' Bulletin 813, U. S. Department of Agriculture, p. 9.

The weir dimensions in Table I, illustrated in Fig. 1, as given by Cone are a little smaller than what would be necessary to obtain rigid accuracy, but boxes of these sizes will give results within 1 per cent of the correct values. Cone outlines the conditions necessary for weir crests and sides as given below.*

Weir Crests and Sides.—"Weir crests and sides should be true, straight and rigid. The crest must be level, the sides must be set to the proper angle with the crest, and carefully spaced to give the correct length of crest, as indicated by 'L' in Fig. 1 and Table I. The 90-degree triangular notch has no length of crest because the sides meet at a point.

"It is not necessary that the sides and crest be sharpened to a knife edge, but the edge of the crest on the upstream side must be sharp in the sense that it is not rounded. If a depth of water not less than 3 inches is to be run over the weir, the crest thickness on the edge may be as great as one-fourth inch without the water adhering to the crest, provided the inner edge is sharp. However, if the crest is beveled, this bevel must be placed on the downstream side, for the upstream face of the crest and of the bulkhead which holds the crest must be even and in a vertical position. The downstream face of the opening in the bulkhead must be beveled outward and downward about 45 degrees to insure free passage of air under the sheet of water as it flows over the weir.

"Instead of cutting the notch in the bulkhead to just the size desired and leaving this rather rough edge to serve as the crest and sides of the weir notch, it is better to make the opening in the bulkhead at least one inch deeper and two inches wider than the desired size of weir opening. This will permit attachment of crest and side strips to the bulkhead so as to project about an inch all around, making more perfect edges, and the overpouring sheet of water will not touch the bulkhead."

On permanent installations it is desirable to make the crests of metal heavy enough to avoid warping. On small weirs the crest may be cut out of a single sheet but on large ones separate strips are necessary. Angle iron is now frequently used, one face of which is bolted into the bulkhead opening in such a position that the other face is flush with the upstream face of the bulkhead.

For temporary wooden weirs, the wood of which the weir is constructed may well form also the weir crest and sides. Since wood warps easily and the sharp edges become worn and splintered, its use for crests and sides is seldom desirable.

Measurement of Head or Depth on Weir Crest.—The measurement of the head or depth of water on the weir crest is obtained with a specially constructed scale or a carpenter's rule. The special scale called the weir gage must be set upon upstream above the bulkhead a distance no less than four times the depth of the water "H" flowing over the crest. This is made necessary by the downward curvature of the water surface near the crest. A scale marked off into feet, tenths and hundredths of a foot on hard wood is satisfactory. The zero point on the scale must be set level with the

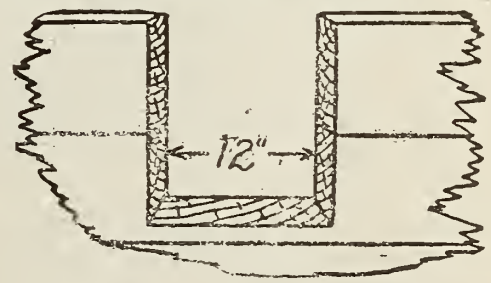

Fig. 3. Rectangular weir.

crest of the rectangular or trapezoidal weir, or with the vertex of the triangular weir. If an open weir pond of sufficient width is used the scale, or a lug upon which to place a rule, may

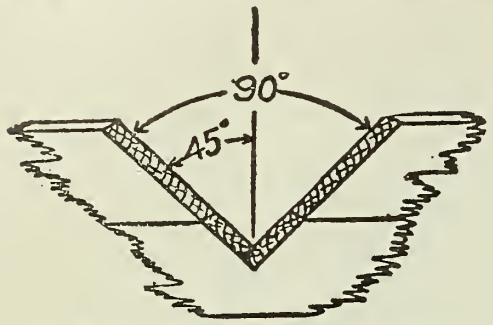

Fig. 4. Triangular notch weir.

be fastened to the bulkhead at a lateral distance from the end of the notch of not less than twice the greatest depth of water "H" over the crest. To get the zero point of the scale or the lug level with the crest, a carpenter's level and straight edge or a surveyor's level must be used. Allowing the water to flow into the pond and slowly rise till it flows over the weir crest is inaccurate, since the water surface will rise appreciably above the crest before flow over the crest begins. Small errors in reading "H" causes relatively large errors in the discharge determination.

Rectangular Weir.—The rectangular weir, named from the shape of its notch, is the oldest weir in use. Its simplicity of form, ease of construction and accuracy make it a desirable device for measuring water.

Because of the vertical ends and the complete end contractions the middle part of the weir discharges more water than the same length of weir near either end, whereas the trapezoidal weir with sloping ends is commonly believed to discharge the same amount of water near either end as it does in the middle. However, extensive experiments conducted by the United States Department of Agriculture indicate that four times the discharge over a 1-foot trapezoidal weir is greater than the discharge under the same head over a 4-foot trapezoidal weir.

Ninety-Degree (90°) Triangular Notch Weirs.—The triangular notch weir is especially adapted to the measurement of small quantities of water, varying from a very small fraction of a second-foot to 2 or 3 second-feet.

Cone has demonstrated that very small crest lengths in the rectangular and trapezoidal weir, e. g. ½ foot, do not follow the laws of discharge for lengths of 1 foot and above. Therefore for the measurement of streams of 1-3 of 1 c.f.s. or less, which are too small for the 1-foot rectangular weir, the triangular-notch weir is especially valuable. The 90-degree weir should be so placed that each side will make an angle of 45 degrees or half pitch with the vertical.

Trapezoidal or Cipolletti Weirs.—The trapezoidal weir, called also the Cipolletti weir after the Italian engineer who designed it, is equally accurate but more difficult to construct than the rectangular weir. Its sides are made on a slope of one inch horizontal to four inches vertical.

The conditions of installation outlined above apply to this weir.

Submerged Orifices.

Submerged orifices as used in the measurement of irrigation water may be divided into two general types. A description of the type of orifices most commonly used—that with fixed dimensions—is here given. The other type is that in which the opening may be varied.

Definition.—A submerged rectangular orifice having four sides which are covered with thin edged plates, and which are so far removed from the top, the sides and the bottom of the water channel, as to cause complete deflection of the water filaments as they pass through the orifice, is

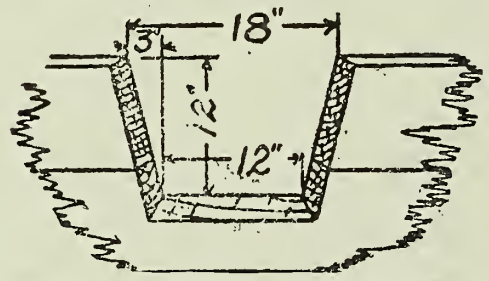

Fig. 5. Trapezoidal or Cipoletti weir.

classed as standard submerged orifice. The sides of the orifice may be made of properly sharpened planks, but it is best to use a thin metal plate.

Conditions for Accuracy. The U. S. Reclamation Service has outlined the following conditions as necessary for obtaining accurate measurements:

"(a) The upstream edges of the orifice should be sharp and smooth and the distance of each from the bounding surfaces of the channel both on the upstream and on the downstream side should preferably be not less than twice the least dimension of the orifice.

"(b) The upstream face of the orifice wall should be vertical.

"(c) The top and bottom edges should be level from end to end.

"(d) The sides should be truly vertical.

"(e) The head on the orifice that should be measured is the actual difference in elevation between the water surface on the upstream side of the orifice and the water surface on the downstream side thereof.

"(f) The cross-sectional area of the water prism for 20 to 30 feet from the orifice, on the upstream and on the downstream side thereof, should be at least six times the cross-sectional area of the orifice."

Advantages and Disadvantages.—The greatest advantage in the use of submerged orifices is found in relatively level sections where it is difficult to obtain fall enough for weir measurements. They have in addition to the above, the advantages already enumerated for weirs.

The more important disadvantages are (1) occasional collecting of floating debris, and (2) collecting of sand and sediment above the orifice, thus preventing accurate measurement.

As in the use of weirs, the ditch or canal immediately above the orifice must be wider and deeper than the

Continued on page 34.

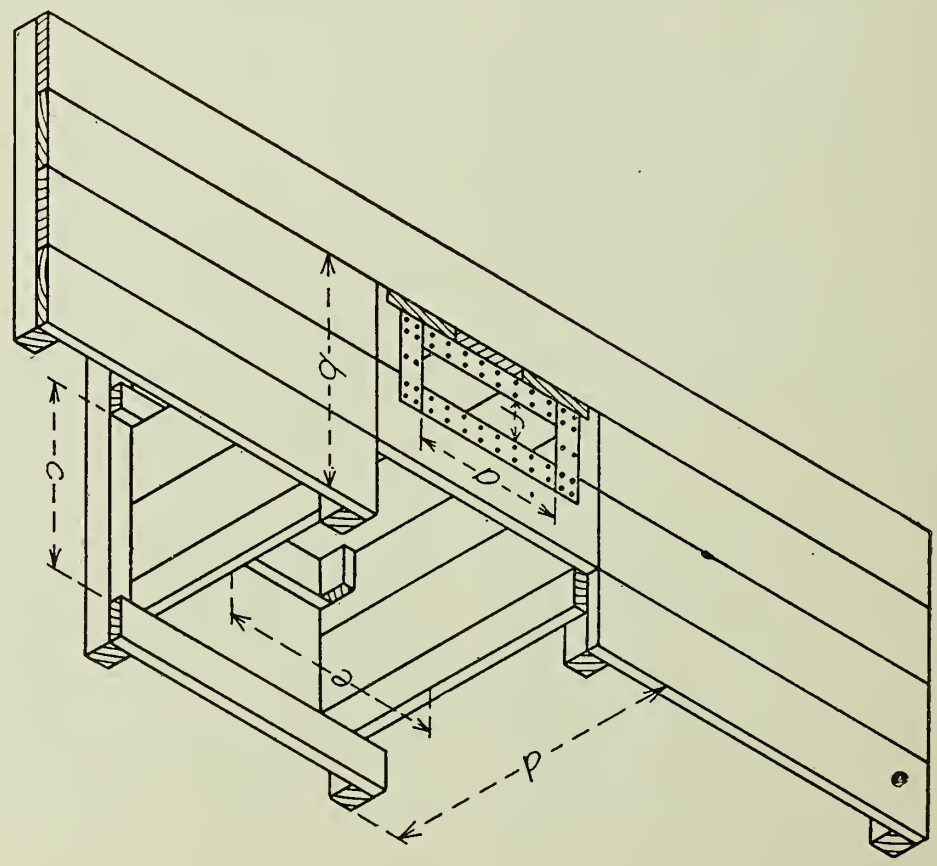

Fig. 6. Submerged orifice used by the U. S. Reclamation Service.

IF you haven't rung-in on the joys of a jimmy pipe with Prince Albert for packing you certainly want to get introduced inside the next hour! Talk about a pal-party! Why, it's like having a pass on a park merry-go-round early in June!

For, Prince Albert has brought pipes into their own—led *three men* to the utmost tobacco happiness where *one man* smoked a pipe before! P. A. has blazed the trail for thousands who figured they would have to do "Kitchen Police" on pipe smokes the rest of their lives! Thousands more have taken the tip to roll their own with Prince Albert!

So, climb into the P. A. pipe or makin's cigarette pastures and have a session! You'll soon get wise, all right, that Prince Albert never did bite the touchiest tongue in your township —and, it's a brace of aces against a two-spot that it never will fuss yours! Read on the reverse side of every Prince Albert package that P. A. is made by our exclusive patented process that *cuts out bite and parch!*

Give Prince Albert the speed-o taste-test and tongue-test *if you want to sing-smoke-songs-at-sunrise!*

Toppy red bags, tidy red tins, handsome pound and half-pound tin humidors—and—that classy, practical pound crystal glass humidor with sponge moistener top that keeps the tobacco in such perfect condition.

R. J. REYNOLDS TOBACCO COMPANY **Winston-Salem, N. C.**

Topworking An Inferior Orchard To Better Varieties

By O. T. Wyckoff

THE search for better fruit. What an interesting story might be written on this subject! And how far-reaching it would be in extent of time and space. Let me furnish a very brief chapter with special reference to top-working poor varieties to better ones.

Several years ago I bought a 40-acre tract in Benton County, Ark., just on the borders of Missouri and Oklahoma, in the famous Ozark region. According to Professor Waugh, Benton County has more apple trees than any other county in the United States. The tract just mentioned had only 13 acres in apples, with five acres in corn, and the balance in hardwood timber or scrubby pasture. The trees are now ten years old, though many of the original planting doubtless succumbed to neglect or hard usage and were reset at a later date. At the time of purchase, some were stunted in growth, but healthy; others sickly and in need of removal; but the majority were in fairly good condition. There were 150 Jonathan and 25 Maiden Blush. The remainder were Ben Davis and Gano. The trees were 28 feet apart each way. The first winter the trees were thoroughly pruned. In some cases nearly half the top was removed to correct a bad head formation. Trees that did not promise well were taken out and Stayman, Winesap, Jonathan and Delicious reset. Then the plow and harrow were put to work and at the proper season cowpeas were drilled in, followed by rye as a cover crop. Meanwhile all the land was cleared and put in corn except eight acres of the best timber located a deep "draw," where there is a good spring. Four acres in a choice location were planted to peaches.

During the next winter we prepared to set an additional five acres, which had been in corn, to apples, and also to top-graft most of the Ben Davis and Gano to Jonathan and Grimes Golden. I made various attempts to find an expert grafter, but without success. The nurserymen to whom I appealed and also the experiment stations were of course all busy at that season. At last, Professor Ernest Walker of the Fayetteville (Ark.) Station suggested that I should send Mr. Shird Robertson, who was caring for my place, in addition to his own adjoining, to Fayetteville to receive instruction in top-grafting. Mr. Robertson was thoroughly qualified in orchard work, but had never had experience in grafting. He proved an apt pupil, for after two or three days' instruction and practice, he gained a remarkable success, as shown by the table below:

Variety of Tree Grafted.	Variety of Scion.	No. of Trees Grafted.	No. of Grafts.	No. of Grafts Failing to Grow.
Ben Davis and Gano.	Jonathan	85	468	none
	Grimes	44	216	8
	King David	11	58	9
	Delicious	12	69	5
Totals	4	152	811	22

The Jonathan scions he cut himself from selected trees in my orchard and that of Mr. E. M. Dunn of the same region. The Grimes scions were from a local nursery, and the King David and Delicious were kindly furnished by Stark Bros. Mr. Robertson began grafting March 19th and ended his work on April 3rd. He attributes his success in part to the fact that he worked only when weather conditions were favorable. He had an assistant to do the waxing. In some cases only part of the tree was grafted this season, but a majority were completely worked over, a few subordinate branches being left with the grafts till next season. Experiments were made with stunted trees. In some cases the entire top was removed and the grafts were inserted in the stub. In others they were inserted in the branches close to the stub. In both, the work proved highly successful. The stub grafts grew vigorously, throwing out branches and making a fine head. As an instance, the entire top was removed from one tree, the scions being inserted in the branches near the stub or trunk. This tree was grafted on April 3rd to Grimes Golden. When the photograph was taken on July 16th, the grafts had made a growth of 30 inches. Others exceeded this growth, but none made a better head.

The trees reset made a fine growth and promise well. In setting this year we used dynamite. The young apple orchard will be in corn for a couple of years, but in general we practice clean cultivation, followed by cowpeas and a cover crop of rye or a similar treatment.

We are giving special attention to all wounds or signs of disease, going over the entire orchard at regular intervals with this sole point in mind and with the proper materials for doing good work. We plan to put the cultivated land into grass or alfalfa, or whatever will give the largest return with the least outlay of time and money, so as to be free as far as possible for or-

Continued on page 30.

Obtaining New Fruit Stocks is Big Problem

THE matter of obtaining or propagating fruit stocks for the greatly increased orchard plantings which will undoubtedly be made in the near future in this country, is an important one and is now engaging the attention of horticulturists, nurserymen and fruitgrowers. In referring to this situation at present, the Fruitman and Gardener says:

"The above-ground portion of your fruit trees may be pure American, but the underground portion is very likely to be foreign. With the exception of the apple and peach, most of the seedling plants on which grafting or budding is done are imported, and even with the apple, many nurserymen have heretofore preferred to import apple seedlings from France and to pay more for them. However, attention has been turned toward a solution of the problem of fruit stock production in this country, and all of the peach stocks are now grown from seeds produced in America."

The devastation of large areas in France where fruit stocks were grown, and the fact that it will take considerable time to start propagating and grow stocks in Europe to an age where they can be used is causing writers on the subject to advocate that immediate steps be taken toward propagating home-grown stocks.

"We are beginning to appreciate more and more," says one of the plant pathologists of the United States Department of Agriculture, "that our future successful fruit culture is intimately associated with the problem of stocks. With the exception of the grape, no far-reaching studies have been made on stocks in this or any other country. We have followed certain empirical practices in the past, but as competition becomes greater and the demand for the highest grades of fruit and plant products increases, we must know more of the actual relation of stocks to quality of product, to the length of life of the tree or plant, to adaptability to soil and climate, to resistance to disease and insect attacks."

One of the questions to be solved, according to the Department of Agriculture, is the practicability of producing in this country the millions of ordinary apple, pear, plum, and cherry stocks which hitherto have been secured largely abroad. Another need is the systematic study of stocks with a view to their improvement and better adaptability to the wide variety of conditions and needs that exist here and that are likely to develop as the fruit industry becomes more complex. If fruit industries are to be maintained, the department thinks it is imperative that there be available full supplies of the ordinary stocks, and it is desirable to find or develop stocks that may prevent some of the losses from insects and diseases.

"If stocks are to be produced in this country to take the place of those hitherto secured abroad," the statement continues, "it would seem proper that efforts should be made by the Government to aid those who are anxious to know where the work can best be done and how it may be done to the best advantage. The problems involved are so complex that the private interests can not well handle them. The chief problems are to find regions and soils in this country where stocks may be commercially grown and to demonstrate on a commercial scale that such stocks are equal to or better than those grown abroad. Correlated with the problem of commercial stock production is that of securing seeds for stocks. There is need for developing our home supplies. This is a long-time proposition, as there are few recognized sources of supply here, such as exist in Europe."

The Effort to Economize in Spraying Materials

IT is stated by the United States Department of Agriculture that on account of the present high price of copper sulphate, the principal active ingredient in bordeaux mixture, that many who are compelled to use this material in spraying are seeking a substitute. The specialists of the department, who have taken this matter up, state that there is no substitute for bordeaux for the purposes it is used in the orchard, and further say that it is the only reliable preventitive for certain plant diseases which are so well known that it is not necessary to enumerate them.

One of the most important things in using commercial bordeaux is to know its value. Methods of calculating the value of commercial bordeaux mixtures have, therefore, been published in Farmers' Bulletin 994, a copy of which can be obtained from the department at Washington.

Every package of commercial bordeaux mixture carries a label on which is given its content of copper. This is usually given in percentage, and by multiplying this percentage by 3.93 the result gives the amount of crystallized copper sulphate, the bulletin explains. If the percentage is given in terms of copper oxid, multiply by 3.14; if in copper hydroxid, multiply by 2.56. In order to calculate the copper sulphate when diluted ready for application, multiply the number of pounds of the concentrated bordeaux mixture to be added to 50 gallons of water by the percentage of copper sulphate.

Physical properties, such as adhesiveness, texture, spreading quality and rate of settling, also are important factors in determining the efficiency of bordeaux mixtures. A preparation containing a large amount of copper, but coarse and granular in texture, with poor spreading and sticking qualities, cannot be expected to give good results in cases where a good fungicide is required. To test the physical properties, dilute the mixture and place a small quantity in a glass tube, and watch the speed with which the solids settle to the bottom. If the copper is held in suspension for a great length of time the physical properties of the mixture may be regarded as good.

In order to reduce the cost of spray material some growers are using a weaker mixture than is commonly advised for the various diseases which require bordeaux treatment. When the disease attacks are mild a bordeaux mixture containing considerably less copper sulphate than is commonly advised may give very good control, provided its physical properties are good and it is thoroughly applied, the bulletin states. When infection is severe, weak mixtures should be avoided, for the resultant loss when they are used may much more than offset the amount saved by using the proper strength.

The department advises that the use of inferior spraying material or so-called substitutes is a dangerous practice and an economy that growers will do well to avoid.

The Origin of the Ettersburg Strawberry

By Albert F. Etter

BECAUSE ordinary strawberries would not grow to amount to anything at Ettersburg, I decided to try to grow some that would. I took the native plants and some other wild species, considered worthless, and out of these and certain varieties of our cultivated strawberries I have made a wonderful collection of strawberries of hybrid origin. One can not conceive just what I mean unless he be a visitor to Ettersburg in strawberry season.

There is no question but that I get all that is in the variety generally, but the astonishing thing to all visitors is that these hybrids are so vigorous and prolific when the regular varieties amount to little under exactly the same conditions growing along side.

One thing that should be constantly remembered is this: that while Ettersburg strawberries are capable of flourishing where other varieties are a failure, does not imply that if other varieties are a success, they should do still better. They may do better and they may not do at all well. Their requirements are different and conditions may suit them or they may not, it all depends. They have excessive vigor and robustness and like their wild ancestors are capable of growing in poor land with little cultivation, far better than ordinary varieties, while if planted in rich moist land they run all to foliage and runners, the fruit will be small and poorly flavored, and the foliage susceptable to attack by leaf-spot fungus. There is so many ways that a strawberry plant is affected by soil and climate that it would take a whole book to go over it all. One general remark might be made on Ettersburg strawberries, and that is this: the poorer the soil the more moisture the plants will tolerate and still produce fine fruit, and the richer the soil the more the moisture in the soil must be regulated if one be successful. I meet with the best success by giving perfect care the first season and after that let them shift pretty much for themselves. I never plant closer than 30 inches each way, and on a richer soil 36 inches would be preferable.

My first attempts to grow strawberries from seed was about 30 years ago. I crossed the old Sharpless with a variety known as the Parry. I grew second and third generation seedlings of this type. At about this time I got in a roundabout way a few plants of a peculiar fuzzy leaved strawberry. Captain Cousins, of Eureka, Calif., had picked up and brought it to Eureka on one of his trips on a lumber schooner to Calao, Peru. It was years afterwards that I accidentally discovered the identity and history of this Peruvian Beach strawberry. It was not only an odd plant, but it was an exceedingly shy bearer. The second attempt it made to fruit, I emaculated the primary blossom on the truss and pollenated it with a blossom of one of my third generation Sharpless-Parry plants. Eleven seedlings were grown from this seed and among these was the Rose Ettersburg, one of the most peculiar strawberries ever produced. Mind you, this variety was produced in the cool foggy climate of Eel River valley, yet it will endure the excessively high temperatures on the desert in Southern California at Thermal and Wagner where it goes up to 120 degrees in the shade, and resists the alkali where the ground is white with it.

Why Orchards Must Be Sprayed.

"What's all this new fangled talk about spraying?" says the oldest inhabitant. "When I was a boy——." That is the difference. Grandfather did not have to contend with the swarms of pestiferous insects, that make orcharding so difficult for his grandson. Spraying was not necessary in those days because apple orchards were more widely scattered and as a result insects were not so numerous. With the increase of orchards, insects became more numerous not only from multiplication but by importation from infested territory and from foreign lands. For many years insects were permitted to multiply unhampered and as a result they made orcharding unprofitable. They are so numerous and destructive now that spraying, pruning, and the best cultural methods must be practiced to make the orchard pay.

The University of Missouri College of Agriculture is now engaged in a campaign to show that small orchards such as are usually found on every farm can be sprayed with profit. If you have only one or two fruit trees the small cost in spraying them will be repaid many times over in a more abundant yield of higher quality fruit.

Prof. O. B. Whipple Resigns

The announcement has just been made that Professor O. B. Whipple, for ten years horticulturist at the State College of Montana, has resigned to take up work in a new field. Professor Whipple was one of the best-known men in his profession in the Northwest. He graduated from the Kansas Agricultural College in 1904; was a graduate student of Massachusetts Agricultural College, 1904-5; was instructor in horticulture at Colorado Agricultural College, 1905-6; and field horticulturist for the Colorado Experiment Station, 1906 to 1909; and since July 1909 has been horticulturist at the Montana State College.

While field horticulturist in Colorado, Professor Whipple was the joint author with Professor Paddock of the book entitled, "Fruit Growing in Arid Regions," and since then has favored the public with several valuable bulletins and other publications on fruit and vegetable work in Montana. During recent years he has specialized on

Prof. O. B. Whipple, who has resigned as head of the department of horticulture at Montana State University, to take a position with a private enterprise.

potatoes. His recent publications on potato breeding, selection and culture, which are the results of the work carried on at Bozeman, contain many new and interesting, as well as valuable ideas.

It is with regret that we announce the decision of Professor Whipple to leave Montana. During his stay of over ten years he has gained the confidence and respect of the fruit growers in Montana, as well as the neighboring states, and through his untiring efforts has done much to further the industry.

Professor Whipple is leaving Montana to assume the management of a five-hundred acre general farming proposition under irrigation near Grand Junction, Colorado, and will take up his new duties the first of the year.

Timely Topics and Advice for the Fruitgrower

Individuals who engage in the work of spraying and fumigating plants as a business for hire in California will be required to register with the horticultural commissioner's office and file regular reports with the State Department of Agriculture according to plans now being made by the department. The purpose of this ruling is to give more effective control over plant pests and diseases, through close coöperation with the men who do the spraying and at the same time to gain better results in spraying for growers. Registration of this kind has been required for some time in one county in California and its results have been so beneficial that it will be made the basis for further extension.

It's a good time now to look for the scale insects which attack fruit trees, says C. L. Fiske, entomologist at the Wisconsin Experiment Station. San Jose is the most destructive of all the scale insects. It spreads very quickly and kills trees outright unless soon checked. The scales are about the size of a pinhead, usually circular in outline and dark gray in color. The distinguishing feature is a central raised portion which is surrounded by a sunken ring, which is again surrounded by a yellowish raised ring. The insects pass the Winter as partly grown scales on the bark of branches or limbs of trees. Young scales, thin and flattened, may be found on the under side of small branches during the Winter. The eggs are laid in a white cottony mass of waxen threads secrcted by the body of the mother scale.

Formulas that have proved very efficient in poisoning gophers and digger squirrels are as follows:

For Gophers: Mix dry ⅛ ounce of strychnine alkaloid and 1-10 ounce of saccharine and sprinkle over a quart of chopped carrots. Place the poison bait in main runways, using care to close the burrow against any light.

Digger Squirrels. Part 1—Mix dry one ounce of strychnine alkaloid, one ounce of baking soda, four tablespoonfuls of table salt and ⅛ ounce of saccharine.

Part 2—Make 1½ pints gloss or laundry starch paste and add one pint of Karo or other heavy corn syrup and one ounce of glycerine. Mix No. 1 and No. 2, stirring thoroughly to prevent lumps. This mixture is sufficient to poison 16 quarts of rolled barley. Do not put bait in burrows but scatter just outside.

R. H. Robinson, associate chemist of the Oregon Agricultural College school of agriculture and experiment station, who has completed examination of apples from Oregon orchards, which bear heavy deposits of spray material, is quoted as saying, "that it would be impossible to eat a sufficient number to cause fatal arscnic poisoning." Mr. Robinson's laboratory tests of the fruit followed a recent alarm raised by Boston health authoritics who ordered the condemnation of California Bartlett pears and Yakima Jonathan apples, declaring the fruit dangerous for food purposcs. The action of the authorities resulted from the illness of a woman in a Boston suburb. She had eaten California pears, and analysis of her stomach contents, it is said, showed traces of arsenic poisoning.

"I endeavored to obtain samples with exceptionally large quantities of spray sediment left on the apple and consequently picked apples from trees that had received five applications during the season," says Mr. Robinson. "Also the strength of these applications was double that ordinarily used by horticulturists generally.

"Chemical analysis of these apples showed that the average amount was only .0007 grams of arsenic. Compared with an average fatal dose, it would be necessary for a person to eat 300 apples."

The question has been much discussed as to the possible life of an apple tree, grown in the Wenatchec district and nurtured by irrigation, says the Wenatchee Advocate. This much only has been established—no apple tree in this part of the state has yet lived long enough to show signs of dissolution or decay from old age. On Pogue Flat there are trees approaching 40 years of age, still thrifty, flourishing and producing fine apples. In the Wenatchee valley proper, trees more than 30 years old are still in a vigorous condition yielding increasingly large crops of apples. Recently the little town of Procterville, Ohio, held a celebration to commemorate the history of the oldest living apple tree in the United States according to the local chroniclers. This trce is said to be 102 years old and is claimed to be the first Rome Beauty tree propogated. While dying at the top, the tree is said to annually produce several bushels of apples.

Probably there is no way of preventing the formation of scum which is universally found on cranberry vines in the spring, according to the Wisconsin Horticulturist. It is a growth or accumulation that comes from long submersion in the more or less stagnant water of the Winter flooding. The longer the vines are kept under, the greater the amount of scum, and the more difficult to remove. Instead of holding the Winter flood till late in May as was the general custom years ago, many successful Wisconsin growers now let the water down, exposing the vines in March or early April. The vines then have the benefit of Spring rains which wash off and remove this scum before it has become so thick and tenacious, leaving the vines in a clean and healthy condition, and before there is any start of new life or growth. Early in May bogs are reflooded and kept under a week or ten days, from the ponds or reservoirs which have also been freshcned and improved by the rains of early Spring.

BETTER FRUIT

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Motor Truck Transportation.

To no occupation has the introduction of the motor truck been of greater value than to the fruitgrower. To emphasize this statement we are publishing the following item taken from the Hood River Glacier:

Gasoline motors have revolutionized the methods of transporting apples in the valley. Of the 2,000,000 boxes of commercially packed fruit that will be harvested this season, it is likely that not more than 100,000 boxes will be hauled from packing houses to shipping stations by horse drawn vehicles. Motor trucks are making short work of apple hauling. It is rare that a grower owning large acreage is found without a motor truck. Truck sales the past year are approaching close to the century mark. Scores of orchardists, buying new passenger vehicles, have turned their old cars into serviceable trucks. In a single line at the receiving stations of the Apple Growers Association last week 19 different makes of trucks, ranging from a huge Mack to a Ford, were seen.

The motor truck has been of great benefit in enlarging the scope of rapid urban transportation in all lines of endeavor, but to none of them is it so valuable as to the fruit industry, which of necessity requires the quickest possible handling of perishable products. This is particularly true of the small fruits which must be marketed daily with the utmost dispatch. More time can be taken with the larger fruits such as apples and pears but there are times also with these fruits when it is advisable to get them to the storage house or to the shipping point as quickly as possible. This the motor truck is acomplishing with an efficiency never before known, in addition to the fact that it is making it possible for a far greater development in fruit production than could be attempted heretofore.

In sections that are isolated from railroad transportation thousands of acres adapted to fruit raising that have lain idle because the owners could not get their products to market are now being planted. In fact this method of transportation has increased the area suitable to fruitgrowing beyond estimation, in addition to doubling the value of the land.

While motor truck transportation has done much toward a greater development of the fruit industry in the past year or two in the Pacific Northwest, it is safe to say that only a start has been made in this direction and that in the next few years it will have reached that point where only the most inaccessible districts will be without this means of getting their products to market.

Like the automobile and the tractor, and other mechanical inventions, the motor truck is reducing the drudgery of country life as well as bringing to it an economy and an efficiency of service of untold value.

Cheap Spraying Solutions.

There are undoubtedly ways in which the fruitgrower can economize in managing his orchard, but we do not believe he can afford to do so by experimenting with cheap and untried spraying materials. The advanced prices of these materials it is reported, is causing some growers to seek cheaper so-called substitutes. It should be remembered that the standard spraying solutions now in use are the result of years of study and experiments made by experts employed to determine their value and that until they evolve or discover something that is better than the sprays now in use, that the safest and wisest plan is to use the standard brands—the brands that have secured results.

The Benefits of Advertising.

The successful sale of the entire crop of the California Walnut Association in a few hours after the price was announced, and the success in marketing Northwest Jonathan apples through advertising campaigns, should be sufficient evidence to fruit growers that money spent in this way is not a contribution, but should be regarded as one of the most important fixed charges of the industry. The Jonathan advertising campaign which was inaugurated in the Northwest by Messrs. Clark, Gwin, Rose, McCullagh and others interested in box apple distribution with the coöperation of John Denny and Wagner & Sons of Chicago, Steinhardt & Kelly and Sgobel & Day of New York, John Cancelmo of Philadelphia and other prominent apple men in the east was a big stroke in behalf of a greater consumption of all varieties of Northwest apples. Attractive copy prepared by Arthur Rule of the Northwest Fruit Exchange and H. J. Woodruff, New York representative of the Hood River Apple Growers Association, played an important part in moving the Jonathan crop at a critical period. This creation of a consumption demand when it is most needed is one of the most valuable features of advertising apart from the organized publicity campaign which should precede the shipping of the crop to points of distribution.

When the returns are in for the Northwest apple crop this year, it should not take much more hammering to induce the apple grower to freely open his pocketbook for advertising funds in the future. When the dealers feel that they can afford to spend large sums to increase apple sales, the grower ought to be convinced that it is sound policy to coöperate and secure still greater results by appropriating funds to be used in a nation wide consumer-demand publicity campaign.

The Hen Fruit Union.

The Hen

I shall not lay as often as of yore,
Our Rooster orders us to organize;
Like everybody else, we're getting wise!
Now for your eggs you will be paying more.
I've scratched until my toes are sick and sore,
But now I take but little exercise—
Our Union has compelled these rural guys
To serve our pickings on a marble floor.
And at our next convention we'll decree
How many eggs each one of us shall lay,
How many shall be hatched, how many stored.
We have demanded better rooms and board,
A holiday on every other day,
And no wire fences, Chickens shall be free!
—Cleveland Plain Dealer.

What the Newspapers Interested in Fruit Are Saying.

Apple growing is a fine occupation to go into for a change and a rest. The commission merchants take all the change and the wholesalers get the rest.—Canadian Horticulturist.

A record price for a citrus orchard is claimed to have been established at Whittier last week with the sale of ten acres of 11-year-old Valencia oranges and lemons for $60,000.—Pacific Rural Press.

There is developing a marked increase in demand for apples in the local markets, but people would like to buy cheaper apples. They are willing to accept poorer grades in order to keep within their means.—Pacific Homestead.

More than 314,000 motor tractors for farm use will be manufactured in the United States this year. Ninety thousand of these tractors are intended for export. We wonder how many are likely to find their way to South Africa.—South African Fruitgrower.

Ripe olives, the last of California's fruits to "fall" for advertising, will soon be advertised nationally out of a fund contributed by growers and packers in equal amounts. The list of advertised or immediately-to-be advertised California products now includes oranges, lemons, raisins, prunes, apricots, olives, walnuts and almonds—all sponsored by associations of growers. Add to these the preserved fruits and vegetables in cans and it is plain to see that California has found itself.—Western Advertising.

Western New York, which last year marketed nearly six million barrels of apples, will this season have only two and one-third million barrels, not including apples used for drying or cider, or sold in bulk on local markets. The forty per cent increase in the western states which pack their apples in boxes will make up in bushels for the short crop in New York state, but will not help much to reduce the price. Buyers in western New York are now paying an average of about $6.25 a barrel.—The Evaporator.

The news that Australia is not going to raise the embargo on importations of apples has not affected the market at all. Now if it were the grain market—those fellows always are looking for some "factor" to put 'er up or down.—The Packer.

It was in the spirit of enterprise and progress that a resolution, agreeing to a small acreage tax to organize the fruit industry, was carried at the annual convention of the Victorian Fruitgrowers' Central Association.

So far as the fruit industry of Victoria can speak with a united voice the Victorian Fruitgrowers' Central Association is the chosen and effective means of such expression.

The affiliated societies represented at the convention have had the proposal for organizing the industry by means of an orchard tax in front of them for many months; the proposal has been discussed from every standpoint, consequently delegates came prepared to vote. Delegates from Northern and Southern Victoria were emphatic in supporting the proposal, and with only four dissentients, the resolution was carried.—The Fruit World, Sydney, Australia.

Motion Pictures to Teach Apple Growing

By a Special Correspondent

ONE of the most interesting features of the meeting of the Maryland State Horticultural Society held recently at Hagerstown, Md., was the showing of a motion picture visualising in a limited way the various operations relating to the production of apples.

The story, based upon actual facts as they have occurred in Maryland, was that of a grower who was confronted with the problem of how to produce salable fruit. He noticed the demand for his neighbor's fruit, and upon inquiry learned of the assistance which could be obtained from the State College through the county agent. Taking advantage of the opportunity thus afforded, he was soon able to sell his fruit more profitably and in addition was encouraged to increase his orchard planting. In the course of several years he became so proficient that there was a constant demand for his fruit. Today finds him successfully competing on the market with growers from all parts of the United States.

The scenario of this picture was prepared by S. B. Shaw, extension horticulturist of the Maryland State College of Agriculture, and the direction was under the personal supervision of D. C. Ellis, in charge of motion picture activities of the U. S. Department of Agriculture. The taking of this picture was made possible through the coöperative effort of the extension service of the Maryland State College and the U. S. Department of Agriculture. It is the first of its kind to be distributed and the initial showing was made at Hagerstown, Md.

The possibilities of visual education are believed unlimited, and this is but the initial step in what the extension service of the State College hopes to do along this line.

One of the most interesting speakers at the meeting was Prof. S. A. Beach, of Ames, Iowa, who presented the "Future of the Fruit Industry." Among other things he pointed out that the fruit growers are not asking for five hours a day, or for time and a half overtime and double time on Sundays. They are not stopping production to scrap and quarrel over conditions, but are working steadily along from morning until night and doing their duty at this time in the history of our country. Prof. Beach then pointed out that the future of the fruit industry was brighter than ever before, and showed by careful analysis the possibilities of the industry.

An important result of the meeting, and one which will interest Northwest apple growers, was the passing of a resolution by the society approving the proposed legislation providing for the standardization of basket hampers, round stave baskets, splint baskets and the establishment of a standard box for apples.

In an endeavor to popularize the more extensive use of Maryland apples, an apple banquet was held at the conclusion of the meeting, and the following menu shows some of the many ways in which apples can be used:

Apple Cocktail

Oysters en Apple

Baked Maryland Ham
Scalloped Apples and Sweet Potatoes
Spinach en Surprise Green Peas
Maryland Biscuits
Apple Chutney Apple Jelly

Gingerale Apple Salad

Apples a la Creole
Applebutter Cookies Sweet Cider
Cafe Noir
Cigars and Cigarettes

Washington Horticulturists Meet

The annual meeting of the Washington State Horticultural Association and conference of the Northwest Fruitgrowers, which was held at Spokane, December 1 to 5, proved to be an interesting session and was largely attended. A good program had been prepared and live topics were taken up for discussion. Among those on the program to address the meeting on matters relating to horticulture were:

E. E. Williams, president of the Washington State Horticultural Association; Prof. A. L. Lovett, entomologist, Oregon Agricultural College, Corvallis, Oregon; P. S. Darlington, district horticultural inspector, Wenatchee, Wash.; Leroy Childs, Hood River Experiment Station, Hood River, Oregon; Dr. A. L. Melander, State Agricultural College, Washington; D. F. Fisher, plant pathologist, U. S. Department of Agriculture, Wenatchee, Wash.; Lee N. Hutchinson, plant disease investigations, U. S. Department of Agriculture: W. S. Peachy, vice-president, Seattle National Bank; J. J. Rouss, cashier, Fidelity National Bank, Spokane, Wash.; L. C. Gilman, district director of U. S. Railway Administration, Portland, Oregon; Prof. O. M. Morris, head of department of horticulture, State College of Washington; Prof. C. C. Vincent, head of department of horticulture, University of Idaho, Moscow; Prof. H. J. Eustace, San Francisco, Calif., western publicity manager Curtis Publishing Company; G. Harold Powell, general manager, California Fruitgrowers' Exchange, Los Angeles, Calif.; Prof. C. I. Lewis, organization manager, Oregon Growers' Coöperative Association; H. W. Sampson, bureau of markets, U. S. Department of Agriculture.

Mayor C. M. Fassett, of Spokane; J. Howard Wright, Yakima; C. J. Newcomer, Federal Bureau of Entomology; Lee N. Hutchins, Plant Disease Investigations, U. S. Department of Agriculture; F. W. Graham, of the Great Northern Railway, Seattle, Wash.; Ralph Sandquist, Selah, Wash.; J. G. Carlisle, Kettle Falls, Wash.; W. T. Clarke, Wenatchee, Wash.; J. R. Everett, Okanogan, Wash.; L. E. Longley, Department of Horticulture, University of Idaho; W. H. Wicks, Director State Department of Horticulture, Boise, Idaho; S. M. McKee, Selah, Wash.; E. F. Benson, State Commissioner of Agriculture, Olympia, Wash.; W. H. Lyne, Vancouver, B. C.; Avery S. Hoyt, Sacramento, Calif.; Prof. E. P. Sandsten, Ft. Collins, Col.; S. O. Vanderburg, Boise; A. L. Strausz, Missoula, Mont.; J. H. McCullagh, Manager Hood River Apple Growers' Association, Hood River, Oregon.

Nitrate of Soda

Many apple growers who had complained of light yields have been using nitrate of soda for several years, with wonderful results. In cases where the supply of nitrate had become deficient many orchards bloomed but failed to set a crop. Orchards in some instances blossomed well for several seasons but failed to set a crop. Nitrate of soda was applied at the proper time, about March, and in the same year produced a crop of about 500 boxes to the acre. Nitrate was used again the next year and a crop of more than 500 boxes to the acre was produced. It is generally conceded by the fruit growers that where apples have failed to set, due to the deficiency of nitrate contained in the soil, that by judicious application of nitrate, where the other necessary soil qualities are present, a good set and increasing yield results.

Northwest Notes from Here and There

OREGON

The Newberg High School has organized an agricultural department and in future will make it part of the regular course to those desiring to take it. Plant husbandry is being taught the first year. Oliver F. Kilham, director, states that the department will appreciate the coöperation of advertisers in BETTER FRUIT in placing the Newberg High School on their mailing lists for literature of any kind that will be of interest to the school.

A very interesting and valuable bulletin on pear harvesting and storage was recently issued by the division of horticulture of the Oregon Agricultural College. The bulletin was compiled by Prof. C. I. Lewis, A. E. Murneek and C. C. Cate. It can be obtained by applying to the college.

The most interesting and largely attended horticultural show which has been given by the Oregon Agricultural College took place at the college during the early part of November. In addition to the fruits of Oregon, there were shown horticultural exhibits from many other states, and the exhibits which were divided into four sections, included the products of pomology, floriculture and olericulture, as well as horticulture.

A large membership in the Oregon Growers' Coöperative Association is expected to result from a mass meeting held at Medford recently. Several hundred Rogue River valley fruitgrowers were present and gave evidence of their interest and approval of the plan to form a local association which will be affiliated with the statewide organization.

The Umpqua Valley Fruit Union, at Roseburg, will become a part of the Oregon Growers' Coöperative Association, January 1. The matter was decided at a recent meeting of the Roseburg concern when its members voted to sell its plant to the Oregon Growers' Association.

A recent census of the farm acreage of Marion county shows that section of Oregon to have a much larger acreage of fruit than was generally supposed. The figures are as follows: Apple trees bearing, 2124; apples non-bearing, 507; cherry trees bearing, 512; cherry trees non-bearing, 456; peach trees bearing, 319; peach trees non-bearing, 44; pear trees bearing, 433; pear trees non-bearing, 191; prune trees bearing, 6611; prune trees non-bearing, 1695; walnut trees bearing, 257; walnut trees non-bearing, 421; loganberries, 1922; blackberries and raspberries, 324; strawberries, 386; other fruits and nuts bearing, 97; other fruits and nuts non-bearing, 61.

Altogether there are 188,850 acres in Marion county producing agricultural and horticultural products.

The announcement is made that Grants Pass orchardists will have a much larger supply of water next year than was possible this season. This is being made possible by the construction of many more miles of main and lateral ditches by the Grants Pass Irrigation District. Much of the new territory to be irrigated is set to apple trees, the owners of which have heretofore been handicapped in the development of their orchards by lack of moisture.

The first shipment of Oregon apples to the Philippine Islands in any quantity was made recently when 4,000 boxes of Hood River fruit was loaded out of Portland for Manila.

Robert C. Paulus, manager of the Salem Fruit Union, who is this year marketing over 300 cars of Willamette valley apples in addition to handling the tonnage of the Salem institution, has again proven his ability in marketing fruit to the best advantage. Mr. Paulus sold the Bartlett pears of the union for $85 per ton, and obtained from 72 to 75 cents per pound for dried loganberries. The prunes which he is handling it is stated will average the growers better than 18 cents per pound.

The activities of the Phez company, which has its headquarters at Salem, Oregon, but also operates plants in Washington, and produces loganberry and apple juice drinks, as well as large quantities of jellies and jams will greatly extend its activities next year. This company is one of the heaviest advertisers of Northwest fruit products on the coast. Up to the present time its demand for small fruits has been far greater than the supply, and it is now conducting a campaign to induce greater plantings of bush fruits in both Oregon and Washington.

With a huge banner on each car an English apple exporting firm recently shipped 25 cars of apples from Hood River in box cars, owing to the fact that it was impossible to obtain refrigerator cars. Each car was supplied with a heater and fuel, and several men were sent with the train to see that the fruit was properly ventilated or heated as the temperatures enroute required. The fruit was shipped to London.

It is now estimated that 5 per cent of the apple crop in the Hood River valley was hit by the severe frost which visited that valley during the latter part of October. Part of this 5 per cent was only slightly frosted, but the Hood River Apple Growers' Association, to be on the safe side, issued a bulletin to the growers instructing them not to pack out the frosted apples with those which were picked before the frost occurred. Many of the Hood River growers instead of packing the frosted fruit sent it to the cider and vinegar manufacturers.

WASHINGTON

A rapid development of loganberry planting in Western Washington counties is noted by M. L. Dean, chief of the division of horticulture of Washington. During the past season the canning factory at Chehalis paid growers $75,000 for small fruits, Olympia concerns paid out over $300,000. In the Puyallup valley the yield of blackberries was 7,000,000 pounds, 90 per cent of which were put up by the canneries at Puyallup and Sumner. The yields of other berries in this section were loganberries, 240,000 pounds; raspberries, 7,200,000 pounds; strawberries, 3,800,000 pounds.

A carload of melons that were shipped out of the Yakima district this year was a record breaker for size. None of the melons weighed less than 30 pounds, and a majority of them weighed 50 pounds, according to the horticultural inspector in that district.

A Rome Beauty apple that weighed 1¼ pounds was recently exhibited at Prosser, Wash. It was grown by H. E. Robinson.

Growers of Winesap apples, in some sections of Washington, had the unusual experience this year of having the fruit drop from the trees in large quantites before it could be picked. Several reasons were advanced for this, one of them being that irrigation was stopped too early, causing the fruit to ripen too fast.

WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

Apple growers, in the vicinity of Selah, are considering the erection of a common storage plant that will hold 500 to 800 cars of fruit. The lack of storage facilities this year is said to have emphasized the need of greatly increased storage.

Washington's apple crop, November 1, amounted to 19,135,890 bushels, based upon a total production which is 89 per cent of that normally produced in a favorable season, according to the report issued by G. S. Ray of the Federal Bureau of Crop Estimates. Last year's production was 16,459,000 bushels. Quality of the crop is 87 per cent, as compared with 88 per cent one year ago.

As the season progresses the magnitude of Eastern Washington's apple crop and fruit yield generally is emphasized. Final estimates of the apple crop of the Wenatchee district, including Chelan, Okanogan and Grant counties, indicate a total yield of more than 11,000 carloads, an increase of 30 per cent over 1918. The newer apple districts on the Columbia river show the largest increases. Thus Entiat is credited with 700 cars, Lake Chelan vicinity 625 cars, Pateros 475, Brewster 440, Malott 150, Okanogan 300 and Omak 800.

A total of 10,325 cars of fruit are reported shipped up to November 1 from the Yakima section, of which 5200 have been soft fruit. There is a shortage of cars, but the railroads are credited with accomplishing substantially more this year than ever before in respect to moving the crop promptly.

Spokane county has shipped 714 cars of apples this season up to November 1, while Stevens county has sent out 145 cars and Lincoln county 91.

The palm for intensive production in Yakima valley has been awarded to John G. Hartman, who took $11,861 from an 11-acre ranch. The returns were as follows: Pears, $6800; peaches, $3600; prunes, $1295, and small amounts from grapes, plums and cherries. A few years ago this place was in such a run-down condition that it was hardly regarded as worthy of development.

Recently C. L. Robinson, district horticultural inspector, announced a ruling that no frozen apples would be shipped unless marked frozen, and sent direct to by-products plants. The edict destroys the hope of many growers and shippers, that it would be possible to thaw frozen fruit and send it as fancy stuff. Robinson, one of the most conservative estimators of frost damage, says the order affects at least 300 cars, estimated at a value of $450,000. While inspecting produce from warehouses, Robinson found a crew behind closed doors engaged in packing frozen fruit for shipment. The stuff was confiscated and the proprietor warned that any repetition of the offense would result in court action. All dealers are warned they must pack in the open.

The apple crop of the Spokane valley is practically completed and the bulk of the fruit is on rail. The estimate of 900 cars seems in a fair way to be realized. Earl Fruit company with packing plants at Otis Orchards and various other points, states that its business is double that of 1918, and that it will pay northwest growers more than $4,000,000.

The Palouse corporation operating a dry land orchard at Fairfield, Spokane county, is reported to have shipped this season 75,000 boxes from its 1000-acre tract. The same company operates 300 acres of orchard at Waverly and 500 acres at Meadow Lake in the same county. The packing plant at Waverly is filled and the overlow is being stored in a church.

During one week 1152 cars of fruit, practically all apples, rolled to market from Yakima, Wash. Estimated value of the week's shipments is $2,000,000. Wenatchee and Yakima apple shippers have cornered the cold storage space in Spokane. It is stated at the offices of the Spokane Fruit Growers company that space for another box of apples could not be purchased in the city.

The Wenatchee valley apple crop this year will bring the growers $20,000,000, according to W. T. Triplett, secretary of the Spokane and Eastern Trust company, after a motor trip through Central Washington. "It is estimated that the valley will have 9000 to 10,000 cars of apples this season," said Mr. Triplett. "The valley is so prosperous and there is so much surplus money available that the successful growers are looking to the Okanogan country, north of them, as their logical field for expansion. The new irrigation projects under way in that section are opening up a vast new apple territory and Wenatchee growers are buying land there."

IDAHO

During the apple harvest in the little village of Fruitland, the orchards were filled with the tents of the pickers, and even the public school buildings were used to house apple pickers. The first week of harvesting, 37 cars of apples were shipped from Fruitland.

Payette has started a campaign to destroy gophers. The plan suggested is to make one day in each week gopher day, and have everybody devote the day to poisoning these little animals. The poison being used is alkaloid strychnine and saccharine, which is put into slices of apples and carrots. Enough of this material to cover 40 to 60 acres can be obtained for $2.40, according to the Payette county farm bureau.

The canning factory, at Payette, had a very successful season, it is reported. There was a good demand, and high prices, for the entire output of the factory. About 100 people were employed during the canning season and $15,000 was paid out for fruit.

Idaho, like other sections of the Northwest, was seriously hit by the car shortage. At one time one district had 600 boxes of fruit that was exposed to the weather on account of lack of cars for transportation. The situation is said now to have been materially relieved.

What They're Doing in California

A recent article in the Monthly Bulletin, of California State Department of Agriculture, tells of an ingenious way of attempting to smuggle into that state Florida grapefruit, which is barred from California by quarantine laws to stop the importation of citrus pests. The grape fruit was sent by express to Riverside from Chicago, and owing to the way the boxes were wrapped attracted the attention of the quarantine officer. When the boxes were inspected they were found to contain Florida grape fruit, but were labelled Oregon apples. The grape fruit was found to be infected with purple scale.

The California Prune and Apricot Growers' Association will erect two packing plants in the San Joaquin valley in order to handle next year's fruit crop. One of these plants, which will cost $100,000, and will be constructed of reinforced concrete, will be built at Visalia, and work on it will be commenced the first of the year.

The apple shipping season in Northern California this year was the most profitable in its history. Owing to the heavy demand for apples last year, old orchards that had been neglected for a long time were pruned, sprayed and cultivated this summer with the result that several districts that had stopped shipping apples, his year marketed many carloads.

The University of California, which experimented this year with drying peaches with the pits left in them, is reported to have achieved remarkable success, and opened the way to saving an immense quantity of small clingstone peaches that heretofore had been wasted. The process as described by H. Sevier, foreman of the University Farm at Davis, California, is as follows: Cut several circles around the peach at right angles to each other and allow the pit to remain within. The peaches are then laid on trays, sprinkled with water, put in the sulphur house and sulphured very thoroughly. They are then put in the sun to dry and will dry down from three pounds fresh to one dry. In preparing the peaches for eating they are soaked until they attain normal size and the slits close up.

The State Department of Agriculture of California, which is being kept busy enforcing the new California fresh fruit standardization law, gives three reasons for the absolute enforcement of the law that are well worth remembering. They are:

1. Protection to the grower, who has properly cared for his orchard, and therefore has a first grade fruit to market.
2. Protection to the grower or dealer who is establishing a reputation for handling a clean product honestly packed.
3. Assurance to the consumer of receiving a standard product.

The Pomona Valley Dehydrating company, which is now in full operation, is said to bear the distinction of having the first commercial dehydrating plant for wine grapes in the United States, or in the world, according to S. A. Burrows, its inventor. At the end of the first day's run the plant had handled 10 tons of wine grapes, half of which would have been absolutely useless for any other purpose because of their overipe and broken condition, due to rainy weather.

Near Portersville there is a 4-acre Lisbon lemon orchard, which was set out in 1907, with trees all grown from buds from one productive parent tree, according to the Weekly Bulletin, of the State Department of Agriculture. Mr. A. D. Shamel, who recently examined this orchard says that not one off-strain tree was found, whereas in neighboring Lisbon lemon orchards, where no bud selection based on performance records and intimate tree knowledge had been practiced in propagation, it was found that from 10 to 70 per cent of the trees were of variable or off-type strains.

D. B. Mackie, field entomologist, office of pest control of the State Department of Agriculture has successfully solved the problem of destroying date storage pests which caused a big loss to date growers. The treatment consists in fumigating the dates under vacuum with carbon bisulphide. This is a new method of fumigation which was originally worked out by him for controlling tobacco pests in the Philippine Islands. By this method all eggs, larvae, pupae and adults are killed by one to two hours fumigation utilizing a twenty-six inch vacuum. Two fumigators, each with a daily capacity of over two tons of dates, are already installed and operating successfully in the Coachella valley. The California Date Association and Mr. A. W. Risher are the growers who will thus protect their pack. Not only are these two machines the first ever used for fumigating dates under this method, but this is perhaps the first commercial use of carbon bisulphide under vacuum in the United States.

European buyers have contracted for practically the entire output of California fruit canneries this year, say fruit dealers and canners of this section. The canneries are having a record year, giving higher prices, employing more help and paying better wages than ever before.

The California State Department of Agriculture gives this explanation of the motive power of jumping oak galls: Many inquiries have been received concerning the cause of the "jumping gall" of the oak tree. By opening the galls, they will be found to contain a worm or larva of a fly (Cynips saltatrix), one of the "gall flies." It is of interest that these same "jumping galls" are humorously described in "The Comic Almanack," illustrated by the famous Cruikshank, and published in London in 1835. The "jumping gall" is an illustration of the motive power that produces the "jump" in the "Mexican jumping bean."

Advocates a Natural Brace for Orchard Trees

Written for Better Fruit by a Washington Orchardist

(Editor's Note—The following article is presented to the readers of Better Fruit on account of the novelty of the idea, and also because it presents an interesting phase of tree grafting. The use of this natural brace is said to have been employed quite extensively in the Pajaro Valley, California, where it worked out successfully. The writer of this article, in a letter to the editor, says that he has employed it on all trees in his own orchard, and that his neighbor has done likewise. The process may not appeal very strongly to the average practical orchardist, but we believe that he will be interested in knowing of the experiment.)

THERE is scarcely any incident so provoking to the owner of an orchard as the breaking or splitting down of some favorite tree and yet this is a fairly common occurrence in a great many orchards. One reason for it, is the abandonment of the central leader tree in modern pruning, and some fruitgrowers have, in disgust, gone back to the central leader type to insure themselves from loss of limbs, crop and temper. However, the advantages of the open center type of tree are so evident that strenuous efforts have been made by the large majority to keep the open center tree and avoid the loss from breakage by more careful pruning, when the trees are young, and in the formative stage, and by judicious thinning of the crop after they have begun to bear heavily. These efforts have helped wonderfully, but, in spite of all that can be done, we find trees propped up with joist and scantling to save them from the utter ruin which even then occasionally overtakes them.

In the Pajaro Valley of California, peopled largely by immigrants from Southern Europe, a system of bracing trees is used which is, at the same time, simple, inexpensive and effective. Occasionally it may be found in orchards in Oregon and Washington, though seldom, if ever, on a large scale. Why it is not used more extensively is hard to understand. For want of a better name this brace, or support, might be called the natural brace.

When the tree is young there are many shoots and tender branches growing from the scaffold limbs toward the center of the tree. Instead of immediately pruning out all of these shoots, they can be made the future life preserver by thrusting tightly together two which grow parallel to each other, from opposite main limbs, repeating the process with other limbs, where it may seem necessary or desirable. Two branches kept in close contact, will after a time, grow together, and when the union is finally secure, the opposite scaffold limbs are held together by a live wood coupling which will last as long as the tree lasts—providing no young George Washington is allowed to try his new hatchet on it—and cannot pull apart, as the strain is not across the grain, but wholly longitudinal. Each main limb supports the weight of its opposite fellow and splitting at the points where each joins the trunk is impossible.

1. A brace just made on a young Jonathan tree.

While the natural brace can be easily formed at almost any time from the second to the fifth year, the sooner it is done, the better, so that the young branches may have plenty of time to knit firmly together. Because of the lack of material to work with, it cannot be done before the end of the second year's growth and sometimes not until the end of the third summer. If possible to avoid doing so, it should not be left later than this. The young shoots should have time to knit and grow strong before any considerable strain is placed on them which would, in most cases, be when they are five years old. One year should be sufficient to start the knitting, or growing together process, if the shoots are twisted tightly, so that there are several points of close contact, and

each succeeding year will strengthen the union considerably.

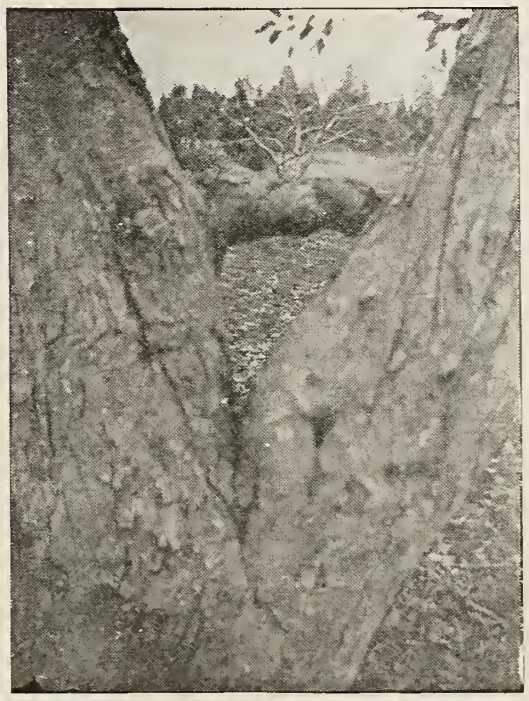
The late fall seems to be, as a rule, the best time of year for the work, as the leaves have fallen, enabling the operator to see his work plainly and twist the branches more tightly than would be possible in the summer time without stripping the leaves. While early spring might also, for many reasons prove convenient, the shoots are more pliable in the fall and therefore easier to handle. Moreover, after the middle of November there is usually less to do than in the spring with its pruning, early spraying, and possibly, ploughing.

It is very easy to make the natural brace on some varieties and much harder, though seldom, if ever impossible on others. The Jonathan apple, for example, nearly always provides a multiplicity of suitable raw material, growing almost at right angles from the main limbs and in just the right direction. They are usually of good length and very pliable. Yellow Belleflower, Spitzenburg, Black Twig and White Winter Pearmain offer few difficulties, but the Rome Beauty is frequently inclined to be obstinate. Each variety will present certain peculiarities, which must be dealt with as they are encountered. Sometimes, when the twigs are short, it becomes necessary to tie the twists in place with soft twine, but, when this is done, the strings should be removed within the year, or before they begin to cut into the bark. In most cases it will be found that the twists, if properly made, will hold themselves without tying.

Cost is a very important item to the orchardist, particularly in these days of heavy initial investments and for

2. Brace a year old on a four-year-old Jonathan tree.

that reason the natural brace will appeal to most growers. Whereas methods sometimes used of wiring the scaffold limbs together, need tools, wire, screweyes and considerable labor; making the natural brace calls only for labor and very little of that. Any man with a little practice should be able to handle two hundred trees in a ten-hour day and a fast worker three hundred or more, depending largely on the varieties. This gives an average cost in labor, which is also the total cost, of about a cent per tree and that it will save many a dollar and considerable disregard of the third commandment, no intelligent orchardist will doubt. Like fire insurance, it



3. The natural brace on a mature apple tree.

not only provides safety from loss, but it makes the owner feel safe, which every fruit grower will appreciate, coddling moth, scab and blight bringing enough gray hairs to his head.

The brace cannot be broken by any strain that it will be called upon to bear; it will grow stronger each year and as long as the tree lasts, the natural brace will be on hand doing its work without additional expense for upkeep or renewal. It is well worth a trial.

With the Beekeepers

Bees are a profitable crop, according to a report by Roy Gilbert, a Tieton, Wash., farmer. Gilbert says that in 1910 he obtained a hive of bees which was swarming while engaged in cutting wood in Tieton. From this he developed 150 stands, which this year yielded honey worth $2600. They are altogether a side issue on his place.

An organization of Inland Empire apiarists to be known as the Inland Empire Beekeepers' Association, and to hold its first meeting in Spokane the early part of next February, is recommended in the report of the executive committee of the Northern Idaho Beekeepers' Association.

National Apple Day

November 6 was observed in Washington as national apple day and every one of 500 sick and wounded soldiers in the hospitals of that state of Washington received a gift of a couple of dozen of the finest Delicious, Jonathan, Grimes Golden and Spitbenburg apples, with the best wishes of the apple growers and shippers of the Wenatchee and Yakima valleys. The idea of remembering the soldiers on apple day originated two years ago, when the International Apple Shippers' Association sent several carloads overseas, enough to give every man in the service there two or three apples.

The recent freeze in the Northwest has taught apple growers a much needed lesson, namely the necessity of erecting additional packing plants and warehouses. This precaution against future frost damage ought to be speeded up the coming Winter and next Summer to a maximum of unbroken and continuous work.—Fruit Trade Journal.

The Use of Fillers in An Apple Orchard

By N. D. Peacock, Horticultural Instructor, University of Georgia

THE average man is impatient. He wants to see the results from his work at once, or he is not satisfied. It is exactly this that has prevented many men from starting an apple orchard. In all probability that has been a good thing for the industry because it has kept the kind of men who would have become discouraged and given up at the first disappointment from starting at all.

To set an orchard and care for it for seven or eight years, or perhaps even longer, without any financial return requires considerable patience and perseverance, as well as a large amount of capital. In order to reduce this long wait as long as possible two systems have been developed. One of these is a system of intercrops, that is, some cash crop is grown between the trees while they are young. The other is a system of fillers. By fillers we mean trees which are planted temporarily between the permanent ones in the orchard. These trees are varieties, such as Yellow Transparent or Wealthy, which come into bearing early and are rather short-lived, the intention being to cut them out when they begin to crowd the permanent trees. Very frequently a combination of these two systems is worked out successfully, and the orchard made to pay for itself during its period of growth.

The planting of fillers in an orchard has given very satisfactory results in some cases, while in others it has proved to be very harmful. The cases where unsatisfactory results were obtained should not be held entirely against the system itself, because they have usually followed failure to remove the temporary trees, when the proper time came, as was recommended. It is very easy to talk about allowing the fillers to remain in the orchard just a certain number of years, but it is quite a different thing actually to cut them out when the time comes. In all probability at that time the temporary trees will be bearing very profitable crops while the permanent ones will only just be coming into bearing. Therefore, removing the fillers will be cutting off the source of income, necessitating another wait of a year or two. Such a practice is decidedly against human nature and requires considerable self-control. Thus we may say that the question, whether or not you should plant fillers resolves itself into the question: How much have you? If you are very sure that you will give the permanent trees first place in your consideration, and cut out the fillers when they begin to crowd, then the plan can be made profitable and can be recommended to you personally.

Under most conditions it is best to use the same kind of trees for fillers as are used for the permanent ones. That is, use apple fillers for an apple orchard, and peach fillers for a peach orchard. The reason for this is that if a different kind of temporary tree is used, times will occur when methods of care needed by the fillers will be worthless, or perhaps harmful to the permanent trees. At such times it is a great temptation to care for the fillers and neglect the others because the fillers are producing your income. For example, if peach trees are used as fillers in an apple orchard, they may suffer from winter injury at some time and be weakened in vitality while the apple trees are uninjured. In that case the peach trees would require a heavy application of fertilizer in order to enable them to mature the crop properly. The apples, on the other hand, perhaps were just coming into bearing; and, should the fertilizer be applied, they would at once stop bearing and begin an extravagant production of wood, which would delay fruiting several years. Evidently the fertilizer should not be applied in such case, even though the peach crop suffered.

I have said that generally the apple fillers should be used in an apple orchard, but there are many exceptions to every rule, and in this case there are many men who have made marked success with peach fillers in an apple orchard. Their success with that system is due to the fact that they held the welfare of their permanent trees uppermost in their minds and arranged their cultural practices accordingly.

Very probably a person who has nerve enough to cut out the fillers when they begin to interfere with the permanent trees will also have foresight enough not to injure his future prospects for the sake of a little present gain. For such a man the system may be highly recommended as a means to reduce the cost of growing an orchard; but for any other person it is a very dangerous system.

Apple Packing Record Broken

Mid-Columbia apple packing records were broken recently by Miss Pearl Saltzman. In four hours and 40 minutes she packed 140 boxes of fruit, more than the average packer will prepare in a day.

Churches Were Full of Apples

Hood River churches were recently bulging with apples. All edifices in which regular services were not being held were secured for storing Newtowns. In other churches the basements are filled with fruit. All available space in local business houses has been requisitioned for apple storage.

Harvesting Shows Increase in Apple Crop

The commercial apple crop of the United States is now estimated at 24,416,000 barrels, by the Bureau of Crop Estimates through its fruit crop specialists. This estimate is based on conditions as of November 1, and shows an increase of 1,239,000 barrels as compared to the October estimate of 23,177,000 barrels, or a decrease of 308,000 barrels from the 1918 crop.

The salient feature of this report is the large increase in the crop throughout the West, notwithstanding a severe freeze the latter part of October in Washington and Oregon, which reduced the total tonnage by approximately 1,000 cars. The production for all the Western states, with the exception of Utah, is far exceeding all former estimates. It is now estimated that these states will produce 32,478,000 boxes, or an increase of 2,943,000 boxes over the October estimate.

The barrel apple states show an increase of 258,000 barrels over the October report, and are now estimated at 13,590,000 barrels. Slight increases are noted in New England States, New York, Virginia, Missouri, and a decided increase in Arkansas. The Arkansas crop being the largest in the history of commercial apple growing in that state.

PER CENT OF CROP IN GROWERS' HANDS.
(See note below.)

State.	Per cent.
Main	28
New Hampshire	32
Vermont	30
Massachusetts	36
Rhode Island	57
Connecticut	53
New York	27
New Jersey	38
Pennsylvania	27
Delaware	10
Maryland	23
Virginia	28
West Virginia	21
North Carolina	13
Georgia	27
Ohio	26
Indiana	12
Illinois	12
Michigan	13
Wisconsin	18
Minnesota	14
Iowa	21
Missouri	24
Nebraska	12
Kansas	15
Kentucky	14
Tennessee	15
Oklahoma	19
Arkansas	19
Montana	25
Colorado	20
New Mexico	12
Arizona	39
Utah	28
Idaho	31
Washington	23
Oregon	52
California	28

These estimates are based on answers to the following question asked the growers the last week of October: "What per cent of the crop is still in the hands of the grower?"

PRIZE APPLES PACKED ON BURRO

Forty miles on a burro's back is the record of the prize-winning plate of Gano apples from Greenlee County at the recent State Fair at Phoenix. Thomas McCulloch grew these apples on his snug little ranch on Eagle Creek, 40 miles from Clifton. The only way he could get them to the fair was to load them onto a pack saddle on a burro's back and move them over the mountain trail to Clifton. From there they went by rail to the County Fair at Duncan, where the horticultural judge, Prof. A. F. Kinnison, decorated their rosy cheeks with a prize ribbon of blue. From here they journeyed by rail several hundred miles further to the State Fair at Phoenix, where Prof. Sanster, the horticultural judge from Colorado, placed again upon them the blue ribbon of first merit.

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The Great Food
For Stock and Poultry
That Has Increased Profits 53%

Here is a wonderful fat food for milch cows, calves, pigs, poultry, sheep and horses that expert stockmen have used for 20 years.

The great butter and cheese exporting countries of Europe, Denmark, Holland and Switzerland, have been its largest consumers because it was easily procured and largely increased there production and resulting profits.

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Increased net profits from butter fat and skim milk amounting to 53 per cent have been recorded in tests made by unprejudiced dairymen.

Its great value lies in its comparatively high fat content. Kaola Meal containing a higher percentage of digestable fat than even linseed oil meal.

But remember, Kaola Meal is not a laxative. It is simply a well-balanced food rich in carbohydrates and protein as well as fat. Feed it in the proportion of 10 to 25 per cent of your other grain foods.

Kaola Meal is made from the pure white meat of cocoanuts after the commercial oil has been extracted. The remaining oil and the cocoanut meal, as we offer them to you, makes one of the finest foods for stock and poultry that any breeder knows.

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We have just completed a new book full of scientific facts on cattle, hog and poultry feeding. It's free. Write us for it. It tells you how the European farmer has gained high yields with this profit food. Clip the coupon now.

Analysis as follows: Protein 16.02%; fat 7.18%; carbohydrates 63.50%; ash 5%.

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Cut This Out As A Memo
A Reminder:

to write to the Palmolive Company for the booklet about Kaola Meal, and get a trial supply from my retailer.

Topworking Inferior Orchards

Continued from page 12.

chard work. The timber and spring adjoining the cultivated land make an attractive pasture proposition.

As to varieties, we have Liveland Raspberry for early, Maiden Blush and Wilson Red June or Mammoth June for mid-summer, Jonathan and Grimes for late summer, and Stayman, Winesap, Delicious and a few King David for fall. Only about 75 Ben Davis and Gano remain.

The grafting has rejuvenated the stunted trees and will shortly bring them to bearing high quality fruit. The young trees are coming on rapidly and in a few years we hope to have an orchard fairly even in appearance and bearing profitable crops of fruit. The acreage is small, but we hope to offset this by having time to make every tree do its duty. Already the orchard is responding to good treatment and some trees have needed a few props to help them bear their load.

Bits About Fruit, Fruitmen and Fruit Growing

Gerald Da Costa, of London, who has been receiving Hood River apples for sale in England for the past nine years writes BETTER FRUIT that the market for Pacific Northwest fruits is ruling high at the present time. Mr. Da Costa says that two cars of California Comice pears in half boxes recently sold in London for 20 to 24 shillings a box, and that a car of D'Anjou pears from the Rogue River valley sold for 32 to 36 shillings per box. Oregon Newtowns, according to Mr. Da Costa are expected to bring around 20 shillings a box.

J. A. Campbell, assistant director of the horticultural division, Department of Horticulture, of Wellington, New Zealand, was an interesting visitor at the office of BETTER FRUIT recently. Mr. Campbell was in the Northwest studying the methods in use by fruitgrowers, and frankly stated that the Australian states expected to become keen competitors of the Pacific Northwest in the European fruit markets, and also to make an attempt to establish markets for fruit in the United States.

Tasmania recently shipped 40,000 cases of jam to this country, and it is reported that other shipments will follow.

Two large bears were recently killed in a Hood River orchard. The animals had been feeding on the fruit for some time, causing considerable destruction to the trees.

Of the 2,000,000 boxes of apples shipped out of the Hood River valley this year, it is estimated that 1,900,000 of them were hauled to the valley shipping points in motor trucks.

The California Walnut Growers' Association sold 23,000 tons of walnuts within 36 hours after the opening prices were announced, and within three days had to decline orders aggregating 93 carloads more, despite heavy importations of nuts from abroad. The association put on a nationwide advertising campaign through the national journals to reach the consumer.

According to historical data which is said to have recently come to light, the first apple harvest in the United States took place on Governor's Island in Boston Bay. The document states that on October 10, 1639, ten fair pippins were picked and brought to Boston. If latter day slang has been prevalent in those days there would be some doubt as to whether this statement referred to apples or damsels. In view of the straight-laced methods of both conduct and speech at that period however, we will have to conclude that it was apples that were picked.

Cannery Notes

The new fruit dryer and processing plant at Selah, Wash., has been handling a heavy tonnage. During the season from 40 to 50 tons of green fruit passed through it daily. The supply of fruit was so great, however, that storage had to be provided until it could be processed.

In three weeks after the work of building the new plant of the Washington Dehydrated Food company, at Grandview, was started at Grandview, Wash., the plant was completed and commenced to receive fruit. The capacity of the plant, which was sufficient at the start to turn out 15 tons of raw material daily is being increased.

The Libby, McNeil & Libby canning plant at Yakima, Wash., recently started canning apples and pumpkins, having completed the run on pears. Over 1800 tons of pears were canned, and the plant will put up 1000 tons of pumpkin and 4000 tons of apples.

The Rupert Canning company, which has two plants in Oregon, had a successful season. The Rupert company makes a specialty of putting out its product under an Oregon brand.

The coöperative cannery of the Eugene Fruit Growers' Association, which recently completed an addition to its plant, is now doing $1,000,000 worth of business a year. J. O. Holt, manager of the association, who also handles the canning plant is one of the most successful cannery men in the Northwest. Besides operating the cannery the association conducts a processing plant, vinegar works, prune dryer and spray-making establishment.

Canned fruits of the temperate zones, such as peaches, pears, cherries, and plums, will find a ready sale throughout Brazil, according to a report of the American Consul in Charge at Rio de Janeiro. Tropical and subtropical fruits—bananas, oranges, pineapples, and guavas—furnish suitable material in unlimited quantities for jams and jellies, so that no large market in Brazil for American jams and jellies can be established. Either tin or glass containers may be used. The goods should be packed in strong wooden cases, which should be strapped with wire. If glass containers are used, they should be well packed in straw or sawdust in order to reduce to a minimum the breakage caused by rough handling. Pilfering during transit should be guarded against by strapping the cases.

Checking Apple Leaf Hoppers

The apple leaf hopper, a destructive insect that occurs in nearly every state of the Union, may be materially checked by a single spraying with 40 per cent nicotine sulphate in the proportion of one to 1,500, combined with soap, according to the bureau of entomology of the United States Department of Agriculture. The solution should be applied against the first-brood nymphs. The same treatment made three or four weeks earlier is effective against the rose leaf hopper, though this species is seldom injurious enough to justify a special application.

The apple leaf hopper causes serious injury to apple nursery stock by extracting the plant juices from the terminal leaves. As a consequence the leaves gradually become undersized and fail to function normally, thereby retarding the growth of the trees. The rose leaf hopper feeds on the lower leaves and produces white or yellow spots on them.

Embargo on American Apples

The American consul general at Sydney, Australia, is in receipt of a communication from the Department of Trade and Customs of Australia, stating that the question of lifting the embargo on the importation of apples into Australia has been carefully considered, but that in view of the large stocks held at present in Australia, it has been decided not to permit importations of apples this year. Inasmuch as the market for imported apples in Australia is favorable only during the months of October, November, and December, the question of lifting the embargo in January is not of importance. Early fruit from Queensland and New South Wales is on the Australian market at that time and the prices fall rapidly. According to the Canadian Weekly Bulletin, it is the opinion of some dealers that hereafter Australian growers who have stored fruits for late markets and high prices will strongly oppose importations even in the month of October, which would leave two months only for importation from abroad.

Measurement of Irrigation Water

Continued from page 10.

average section of canal, in order to cause the water to approach the orifice very slowly.

The depth of water or head may be measured by means of carpenters' rules or by specially constructed scales like those already suggested for weirs. One scale should be placed on the upstream side of the orifice and one on the downstream side with the zero end of each scale at the same level near the top of the structure.

A complete bulletin by Mr. Israelen on this subject can be obtained from the Agricultural Experiment Station at Logan, Utah.

Nut Growers Have Good Meeting

The annual meeting of the Western Walnut Association, held in Portland, November 12 and 13, was attended by a large number of nut growers from Oregon and Washington. There was a very attractive exhibit of filberts and walnuts, and the program was an interesting one. For the fifth time J. C. Cooper, of McMinnville, was elected president of the association. The other officers for the ensuing year are: A. H. Henneman, of Portland, vice-president for Oregon; A. A. Quarnberg, of Vancouver, vice-president for Washington, and A. J. Harris, of Portland, secretary-treasurer. Mr. Harris succeeds Knight Pearcy, who has been secretary of the organization for several years, and declined to again serve in this capacity.

The winners of the $100 cash prizes offered by M. McDonald, president of the Oregon Nursery company, for the best nuts from seedling trees for two years were John Spurgeon, Vancouver, Wash.; Henry Sexton, The Dalles, Oregon; T. H. Brooks, Silverton, Oregon; E. J. Stewart, McMinnville, Oregon, and R. E. Brown, Vancouver, Wash.

Among those who delivered addresses on nut culture were: Chas. Trunk, who spoke on "Planting the Nuts in the Orchard;" J. C. Herren, "Nursery Grafting Filberts;" J. R. De Neui, "Walnut Growing Experiences;" J. F. Langner, "The California Walnut Growers' Association;" Frank V. Brown, "Nuts in Confectionery Use;" John Norelius, "Filbert Growing;" Robert C. Paulua, "The Oregon Nut Grower;" Geo. Dorris, "Filbert Growing in the Northwest;" C. A. Reed, chief of the division of nut culture, United States Agricultural Department, "Nut Growing in the United States;" H. A. Kruse, "Pruning the Filbert;" N. F. Britt, "Growing Walnuts on Logged Off Land;" Knight Pearcy, "A Tree Agriculture for Logged Off Lands;" Fred Groner, "Drying Walnuts;" Geo. Hall, "Increasing the Consumption of Oregon Nuts;" Prof. C. I. Lewis, "Maintaining the Vigor of Nut Tree;" R. Graves, "Filbert Varieties;" J. C. Cooper, "Promising Seedlings."

Increasing Bush Fruits

Continued from page 5.

true in canning and is equally not true in the whole-fruit preserves in glass.

In the black raspberry the Munger variety appears to do the best in the canneries of the Pacific Northwest, therefore, the grower should produce the black raspberry that the canner desires to purchase.

In the loganberries, it doesn't make any difference to the manufacturer of loganberry juice whether it is the loganberry or the phenomenal berry, but from a canning standpoint the larger the berry the more satisfied the consumer. Inasmuch as the phenomenal berry is very much larger than the loganberry and of equally good quality, it would be advisable to set out a portion of the new plantings of phenomenals and a portion of loganberries, in fact, the variety to plant depends entirely upon the adaptability of the berry to the particular soil that you are using. The phenomenal berry is a little more tender in some places than in others, but it is not advisable to undertake to plant too great an acreage of phenomenals without having some experience as to the adaptability of this berry to your particular community.

In strawberries, of course, we all appreciate that there is no strawberry equal to the Clark Seedling, either for fresh consumption, or for canning purposes; but the Clark Seedling is generally considered a shy bearer, therefore, if you could produce a crop of one hundred per cent more berries of some other variety, the chances are that the crop producing the big yield will be the greatest price-getter for you. Next to the Clark Seedling, from a canning standpoint, is the Wilson, which is an excellent canner and a very fine berry for every purpose. In the Puget Sound country the Marshall comes third, as it is a good cropper and an excellent cannery berry. The Magoon berry appears to grow the greatest yield per acre, but if berries are plentiful it would be impossible for the grower to sell any Magoons to a canner just as long as he is able to procure any other variety for his requirements.

Gooseberries are becoming a great factor in the manufacturing of jams. The old-fashioned Oregon Champion appears to be the most desirable that can be grown. Gooseberries should be planted not closer than five feet apart and should be sprayed very thoroughly at least twice every year, so as to produce the best results.

Victoria red currants are good, heavy croppers. The berry is of good size, good texture, and of excellent quality. The black currant is very desirable for jam-making purposes and can be marketed at a very satisfactory price.

Damson plums are in great demand for jam-making purposes, as are also quinces. Quinces and Damson plums do about as well in this part of the world as any other tree fruit that is available; they are hard to secure for the reason that there are so few places that they can be used to advantage, but the increased demand for jam makes them a very desirable product.

The apple grower needs a reasonable amount of bush fruits on his farm so as to give him early money. The gooseberry is the first berry to ripen, then comes the strawberry, red raspberry, loganberry, currants, and finally the blackberry. All of these crops are matured and out of the way before the apple crop is ready to harvest, and there is no grower who should not enter into all of these lines to a reasonable extent.

Growing Blackberries.

To get the best results from cultivated blackberries they should be trellised, and when pruned the bearing wood of the past year should be cut entirely away, leaving the new growth to bear the coming season's crop. If the new shoots are too close together they should be pruned out so as not to leave too many vines. The same rule applies to all other berries that bear their fruit on canes.

Improving the Seedling Walnut

Continued from page 7.

ling walnut that will win its way over the grafted varieties that we have will be a greater prize in itself than any man or association of men can offer in money.

I herewith submit a score card for a seedling tree and nut. It may not be scientifically, according to the ideas of some. I give it for what it is worth. Experience and investigation may suggest changes.

SEEDLING WALNUT SCORE CARD FOR WESTERN OREGON AND WASHINGTON.

	Perfect Score.
Tree Quality—	
Vigor	15
Productivity	8
No blight	7
Proximity of blooms	5
Budding out April 20 to May 20.	5
Maturing before October 10	5
Uprightness	5
Tree score total	50
Nut Quality—	
Taste	25
Kernel, light color	5
Form, round, size No. 1	5
Shell and kernel, weight equal	4
Cracking out readily	5
Sealing quality	4
Shell color and smoothness	2
Nut, total score	50
Total tree and nut score	100

There are many fine seedling walnut trees in the Dundee orchards of Trunk, Dearborn and Prince. Also in the extensive orchards of the Matthews Planting company in Yamhill county. Mr. McDonald reports a very fine seedling at Oregon City, Mrs. Chas. T. Kamm has a very fine Mayette seedling; Senator McNary has a very fine prolific seedling at his home in Salem. One of the best is reported from W. B. Andrews at Eugene. I have two seedlings of promise, but have not had sufficient time to recommend them. The best one is a seedling from the Prince. It misses the frost, both in the Spring and Fall, and is of high quality, but does not produce as well as the other, which is wonderfully prolific, but the kernel is dark at the point. There are many other seedlings of promise, but it will take time to determine their worth.

Photo of life size Stark's Golden Delicious-apples shown in natural coloring and actual size—50% larger than Grimes Golden. Only part of a big crop of an **18-months-old** top-graft of Golden Delicious—a World's Record for young and heavy bearing. Has borne every year since — **three big crops within 4½ years.**

The $5,000 Golden Apple

America's Keenest Growers Are Planting

Stark's Golden Delicious — the most deliciously flavored yellow apple in the world.

Superior to Grimes Golden in quality and size and flavor. Keeps four months longer. Fills the Grimes Golden demand long after Grimes Golden is gone from the markets.

We discovered the original Golden Delicious tree several years ago, growing, bearing abundant crops of prize-size fruit, on a barren West Virginia mountainside. We bought this remarkable tree for $5,000.00—the record price for all time for a single apple tree.

We propagated young Golden Delicious trees from the "wood" of this original tree—and Stark's offered these trees to fruit growers.

Every year since we have quickly sold out every Golden Delicious tree we could grow.

Silas Wilson, the noted Iowa and Idaho 750-acre orchardist (photo at left) declares:

"All the big apple buyers say it is the handsomest, showiest apple they have ever seen!

"The best apple I have ever tasted since you introduced Stark Delicious. Tree is hardy as Stark Delicious and Wealthy. **Sets an apple for every blossom!"**

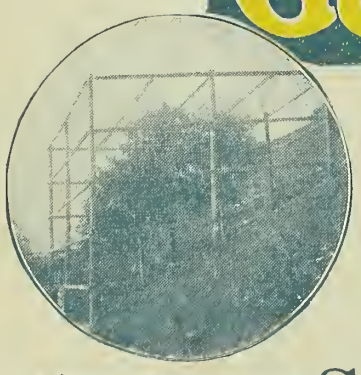
Our advice to you is to plant Golden Delicious **this year.** But—**order quick**—demand is twice as great as the supply. Better write today.

Use the Coupon Today

Silas Wilson

STARK'S

Golden Delicious



The $5,000 Tree in a Cage
The original Stark's Golden Delicious in cage protected by burglar proof alarm system.

Endorsed by Over 25,000 Growers

"At last! A yellow apple that beats Grimes Golden, with all the Grimes' good points and none of its weaknesses!" Orchardists in Iowa, Illinois, Arkansas, Kansas, Ohio, New York, Missouri, Pennsylvania, Virginia, West Virginia, Idaho, everywhere—are praising and planting Stark's Golden Delicious in generous quantities.

J. L. Webster, Wenatchee, Wash., sent us part of his great 1919 crop of Golden Delicious—all splendid apples, which, though "orchard run," averaged 64 to a box. He wrote:

"Golden Delicious strong grower, heavy bearer, does not drop. Keeping quality equal to old Winesap. Eating quality equal to Stark's Delicious. Will surely excel in world's apple markets."

FREE! 1920 Year Book "Prize Fruits"

Get all the interesting facts about this fruit — and all Stark Bro's Apples, Peaches, Pears, Plums, Grapes, Cherries and Berries. **Act quick.**

Stark Bro's Nurseries, Box 6, Louisiana, Mo.

Send me your 1920 Tree Year Book—"Prize Fruits"—at once.

☐ If you also want our Free Book, "Secrets of Ornamental Planting," and information about Free Landscape Plans—check in square to left.

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